VIDEO: DAVIC MOVES CLOSER TO INTEROPERABILITY **TECH FOCUS:** SMART TESTING

America's Network

OCTOBER 15, 1995

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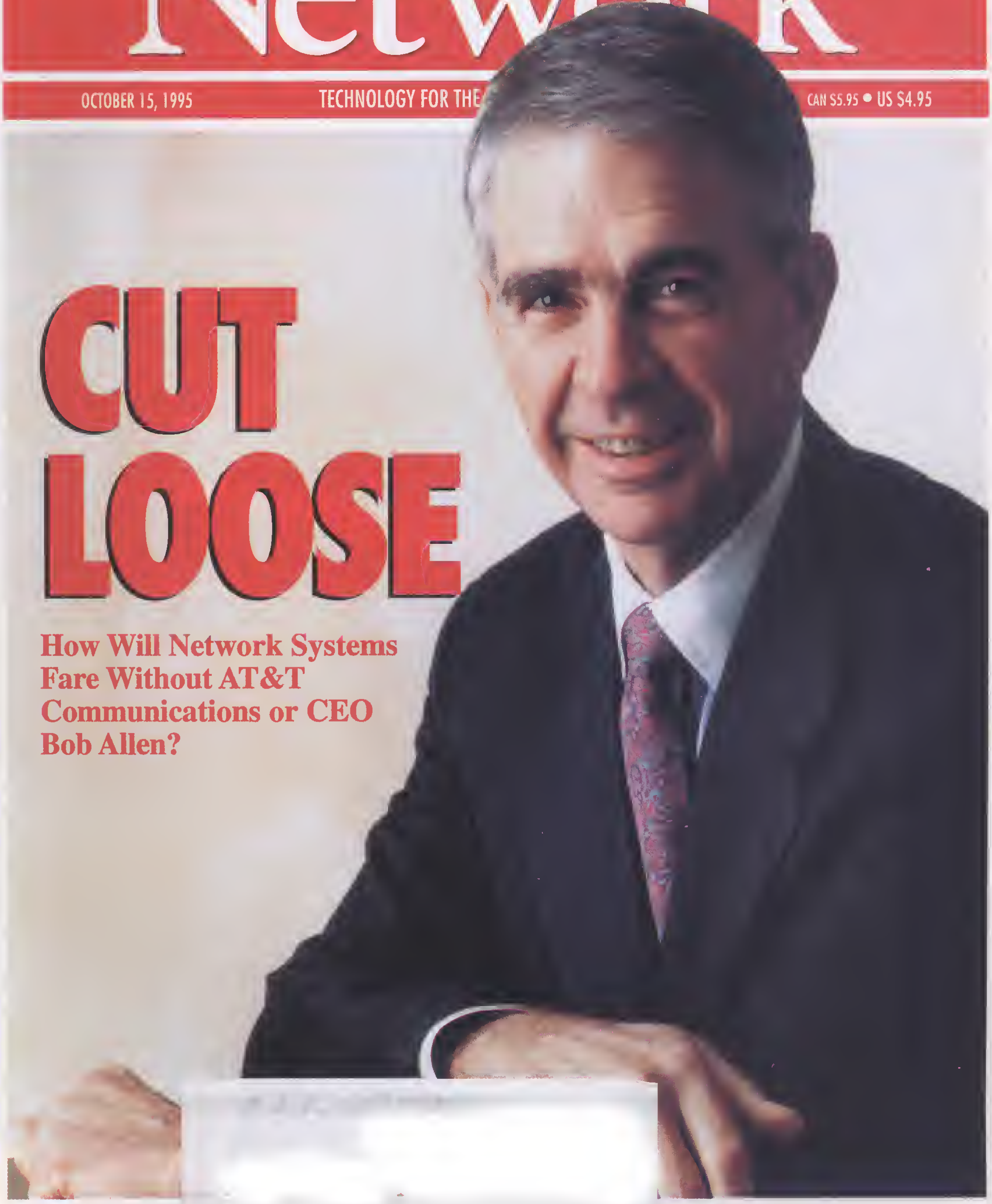

CUT LOOSE

How Will Network Systems Fare Without AT&T Communications or CEO Bob Allen?

[redacted]

Sonet's potential power is no great mystery, but who do you have to know to put it to work?

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FROM THE EDITORS

BREAKING UP IS SMART TO DO

In announcing his company's decision to disconnect its equipment and computer units from its core network business, AT&T Chairman Robert Allen allowed that the "days of vertical integration are over." He might as well have acknowledged "competition is here to stay." For despite all the expressions of surprise from the telecom industry, AT&T's restructuring is already passé.

That's because AT&T's restructuring was foreordained. The company was dismantled by Bert Roberts, William Esry, John Malone, Ray Smith, Dick Notabaert, Royce Holland and other communications executives hell-bent for profits. It was scripted by service providers who were uneasy feeding the mouth that bit them.

Against this array, AT&T awkwardly positioned itself as a next-wave company with traditional values. But like other organizations trying to straddle technology generations, the pieces didn't quite fit, both inside and outside the company.

There were too many competing interests. A company that is trying to attack and provision its competitors simultaneously, as AT&T did, sends an ambiguous message. And markets abhor such vagueness.

By the same token, AT&T recently announced its plans to become the Internet services and content packager to the world. Again, from what market position does a company say it's in both the central office and the client-server businesses?

Now that it has untangled itself, AT&T poses an even greater competitive threat in the global market for communications services. What's more, the market knows that AT&T Network Systems, even without the AT&T brand name, is the world's leader in big switches. But a chunk of change spent with AT&T-NS no longer will line the coffers of the company's services arsenal. That undoubtedly will work to the unit's advantage.

The restructuring is a smart move for AT&T and ultimately for its customers.

PAUL McCLOSKEY EDITOR

America's Network

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ABP BPA INTERNATIONAL

AT&T breaks up (again)

CORPORATE FOCUS

AT&T's Planned Equipment Spinoff Is Winning Praise

By John J. Keller
Staff Reporter of The Wall Street Jou

NEW YORK – AT&T Corp. is pu its new breakup to focus on its long-distance and cellular services, b hotter prospect may turn out to b vast equipment businesses it is sp off to shareholders.

The new equipment company, operations will produce about $22 bil revenue this year, includes ne switching and transmission gear, sumer telephones, office phone sy and microchips. Each line is a hot g prospect with healthy profit in its c tive market.

The as-yet-unnamed company al have Bell Laboratories as its pr development engine, giving it mar cachet unmatched in the industry. could make for one of the most succ offerings in years, analysts said, as plans to offer a 15% stake in the equi company to the public sometime earl year, spinning off its remaining inte holders in late 1996.

"It could be very hot," said F

AT&T, REVERSING STRATEGY, ANNOUNCES A PLAN TO SPLIT INTO 3 SEPARATE COMPANIES

THE NEW COMPANIES

Dollar figures represent each new company's approximate share of 1994 revenues.

AT&T
$49 billion
Long-distance service; wireless communications; AT&T Universal credit cards, research and consulting, on-line

COMMUNICATIONS HARDWARE
(not yet named)
$20 billion
Making and selling phones, other communications equipment and computer chips

GLOBAL INFORMATION SOLUTIONS

New Phone Unit Would Still Be 12th-Largest Company in U.S.

By MARK LANDLER

More than a decade after breaking up the Bell System to settle a Federal antitrust suit, the AT&T Corporation announced yesterday that it would dismantle itself yet again — this time voluntarily.

AT&T unveils 3-ring surprise

Company

AT&T Corp. shocked the corporate world yesterday by announcing it will break itself into pieces for the second time in just over a decade.

would dismantle the $75-billion monolith. It will be replaced by independent companies: A phone pany that will provide long-di

New Era Dawns For AT&T—Again

Three spinoffs hope to provide better user focus

Most Employees of Bell Labs Will Join Equipment Business

Now for the news about the one thing that won't change.

Our commitment to you. Our customers.

There's no shortage of press concerning the restructuring of AT&T. And it's good news for our customers. In 1996, Network Systems will emerge as the heart of a new systems and technology company, better able to serve your needs in an increasingly competitive marketplace.

In the meantime, be assured our focus on you will be stronger than ever.

We won't miss a beat in delivering solutions that meet your specific network demands. Innovative solutions, fueled by the R&D of Bell Labs.

Like our new 5E-10 Software and Long Distance Platform. They allow you to offer the new services customers want on the 5ESS®-2000 Switches you already have.

And after the reorganization?

We'll be a nimbler company, able to respond to you even faster. With the same quality and reliability you know you can expect from us.

And you'll have no reason to doubt our commitment.

Tomorrow is filled with promise for both of us.

We're more ready than ever to work with you today.

AT&T Network Systems

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LECs MISSING BOAT BY IGNORING RESIDENTIAL SECOND-LINE MARKET

Thomas Crampton
Managing Consultant, A.T. Kearney

Most local exchange carriers are missing a major opportunity to increase revenues and improve market position using existing infrastructure. Focus on providing broadband services has diverted attention from a more immediate possibility to generate additional cash flow—residential second-line services. The potential becomes evident with the following:

- Work at home, much of which is accomplished by phone and fax or computer and modem.
- Technology acceptance, including computer usage and cellular phones, pagers and personal digital assistants.
- Demographics: Baby boomers are growing older and having children, who rely on the phone and are using computers (with modems) as educational tools.
- Rising incomes: Consumers can afford to invest more in communications services.

Numbers bear out these trends. One in three U.S. households has a PC, one in seven has a modem and more than 3 million have accessed the Internet. Increased connectivity means increased demand for telecommunications usage and residential access line growth.

Yet a survey of LECs revealed little or no marketing focus placed on the residential second-line market. In a few cases, programs exist that provide support for advanced services, but they are directed primarily at the business market.

Indeed, several LECs expressed the opinion that second-line services would require advanced telecommunications services (i.e., ISDN). As such, any mass marketing would cause network provisioning constraints since not all central offices have this capability.

Regrettably, many LECs would be hard pressed to answer specific questions about the facilities available for provisioning second-line services to the home. The simple question of what percentage of homes has a viable second pair of wires becomes a difficult one to answer. As the local network continues to open to competition, the incumbent LEC likely will be required to build the necessary facilities for resale of local exchange services. In this case, not only will the competitor be able to erode the LEC's customer base by using the "other useful pair" for second-line services, the LEC also may have to construct additional facilities where needed.

If LECs propose ISDN as an alternative to second-line services, they should consider several major barriers:

- Costs are still too high. Consumers must purchase additional equipment, which may cost $800 to $1000, often in addition to high installation charges and monthly fees.
- ISDN is still "technically daunting" for the residential market. Considerable effort must be spent by the "non-technical" consumer to ensure equipment and service are integrated and work properly. The lack of a simple, user-friendly solution will keep ISDN away from the mass market until simple turnkey solutions are available on a wide scale.
- Availability is still an issue. Service availability depends on a consumer's specific location and the serving central office. More important, even if ISDN is available to the consumer, the destination also must have ISDN availability, the service and the equipment to transmit digital signals at ISDN's higher speeds.

Be There Now

A second line may be the primary conduit for other information-based services such as news, entertainment and education. But LECs must capture this market now and begin transitioning consumers to broadband services when available. If not, a competitor will.

HERE TODAY

In time, ISDN may become a means of addressing the burgeoning demand for connectivity. However, residential second-line services are a way to address this market demand today, using today's network.

If LECs continue to ignore this demand, competitors surely will fill the gap. A study assessing competition for the delivery of advanced communications services found that if the incumbent LEC did nothing to respond to potential competitive inroads, it could lose 20% to 50% of its local telephone market share. Providing second-line services gives competitors direct access to LEC customers to market and sell their bundled services.

As most LECs position themselves for an interactive, multimedia-driven future, it will become increasingly important to create an image as a provider of services other than just telephony. For example, a second line may be the primary conduit for other information-based services such as news, entertainment and education. But LECs must capture this market now and begin transitioning consumers to broadband services when available. If not, a competitor will. ■

Comments excerpted from Crampton's report, "Residential Second Line Services—The 'Trojan Horse' in the Battle for Market Share." A.T. Kearney is the management consulting subsidiary of EDS.

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TECHNOLOGY

1 0 1

BY LIMITING DATA ERRORS, BERT CAN EARN CUSTOMER LOYALTY

Mark Dziatkiewicz, Technology Editor

Voice conversations on digital facilities are flexible, but digital data's not as forgiving. Customers demand data be received as transmitted. And when what comes out isn't what went in, carriers rely on BERT for transmission problem sleuthing.

Since carriers often provide error rate performance guarantees—with rebates—on services, speedy problem source identification is important. Bit error rate tests (BERTs) are the right place to start. "If after a couple of months a customer starts complaining of errors on data, you need to take [the circuit] down and test to verify the errors and identify where they're coming from," explains Steve Weakley, product line manager for Telecommunications Techniques Corp. (TTC). "You can run a BERT and verify the performance over a period of time. If error performance goes below [a guarantee], customers can get a rebate on the circuit."

Measuring Performance

If you transmit a 1-0-1 pattern, you look for a 1-0-1 pattern on the far end. If it comes in 1-0-0, you know you've got a problem. It gives you an idea of the performance of the circuit when you're running customer traffic. If I have one error every thousand bits, I have a 10^{-3} error rate.

BERT gives a representation of circuit performance. It sends data patterns down a digital facility and records the output at the far end.

"You're transmitting a known changing pattern, receiving it on the far end and comparing the two, looking for any errors," he continues. "If you transmit a 1-0-1 pattern, you look for a 1-0-1 pattern on the far end. If it comes in 1-0-0, you know you've got a problem. It gives you an idea of the performance of the circuit when you're running customer traffic. If I have one error every thousand bits, I have a 10^{-3} error rate."

Test sequences combine strings of zeros and ones into pseudo-random patterns. And several different tests have evolved, according to Weakley. "When we first started turning up T1 circuits, we'd run fixed patterns over the circuits," he explains. "They would do that before putting customer traffic on to see if it was running OK. The BERT would run fine, but when they put customer traffic on, it wouldn't work."

Discrepancies stemmed from BERT patterns not adequately stressing repeaters. "With the fixed patterns, the actual problems were in the repeaters. Customer traffic with low densities gave them problems," says Weakley. "They came up with the T1 DALY pattern. It has more interesting zero and one sequences to stress the repeaters."

Data errors stem from multiple sources including bad equipment or physical problems on the line causing dropouts, noise and jitter. BERTs identify data transmission problems but not sources—that's up to technicians or sophisticated testing and monitoring systems. Good diagnostic and problem isolation techniques go hand in hand with circuit testing.

"You usually have two types of failures," he says. "Something that takes down the circuit completely or degradation of the circuit. One of the biggest problems is backhoe fade, where they dig up the cable and knock it out completely."

DIGITAL HIERARCHY

BERTs have followed the digital hierarchy's progression—what's good for DS1 is good for other rates. "Everybody was so used to running these over T1 that when it came to a DS3, they said they needed to do the same thing," he adds. "On a DS3 you can use one of the embedded DS1s to run a BERT. If you're running a DS3 and see the error rate is 10^{-5}, you can drop out one of the DS1s and run a BERT—end to end—to check for errors. Since it's a random distribution, the 10^{-5} error rate will hit the DS1 and DS3 the same."

Sonet transmission systems incorporate error rate testing capability, but it doesn't substitute for BERT. "In Sonet, the system automatically monitors the performance of the circuit," explains Weakley. "What they're doing is monitoring the BIP [bit interleave parity] error rate to switch it to a protection channel automatically. It's doing the same thing [as BERT] but using parity instead of bits. Bit testing is more accurate than BIP testing, but the only way you can do a bit error rate test is out of service."

BERT proves its worth with traditional digital transmission, but Weakley questions its ATM application. "In ATM, you're transmitting cells which could be switched through different paths in the network. With DS1 and DS3, it's TDM [time division multiplexing]," he contends. "If you ran a BERT over ATM, you just know there's a problem [not where]. The logic doesn't apply."

Controversy aside, BERTs' bit integrity checking provides data communications value—customers expect and pay for nothing less. ■

WHICH IS BETTER? HFC OR SDV?

OR

OR

OR

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EMMY TIME

Patty Wetli
Associate Editor

Few of us remember who took home the award for best television drama (hint: *NYPD Blue*) at last month's Emmys, to say nothing of who grabbed the statue for outstanding achievement in engineering development. That would be C-Cube for its MPEG digital video encoder.

BETTER THAN SEINFELD - Unlike most actors, C-Cube chief Alex Balkanski actually took home an Emmy.

Putting the science in the Academy of Television Arts and Sciences, CEO Alex Balkanski accepted the trophy at a not-quite-ready-for-prime-time ceremony held the night before its more glamorous counterpart for the "arts." Company spokesperson Mary Sharpless called the award a victory for the entire industry. "NTSC has been the standard for 30 years," she notes. "MPEG-2 is in its infancy." But in another 30 years, we'll all be watching MPEG TV.

But will we be watching network TV? Ironically, the academy chose to reward a compression technology that enables direct broadcast satellite, video on demand and increased CATV channel capacity—all of which could put its bread and butter, the Big Three networks, out of business. "It allows for competition," admits Sharpless. But she adds that the networks use the encoder for video storage.

Besides, she predicts that for at least the next 10 years, the networks will continue to dominate the TV market. "Where would we be without Jerry Seinfeld?" she asks.

Probably getting lives of our own.

THEY SAID IT

"Hell is a loss of privacy, and nothing brings us closer to hell than telecommunications technology. We will all end up consumers with no privacy in a technological world with no protections."—Delbert Smith, technology lawyer, to telecommunications experts gathered at the International Institute of Communications' conference in Osaka, Japan.

DRESSED TO KILL, CASUALLY

This just in. For some unknown reason, we were faxed a copy of GTE Mobilnet's new business casual attire guidelines, defined as "less formal than the traditional shirt, tie, suit and/or dress" (*and*/or—that we'd like to see), but "more formal than beach, jogging or vacation attire."

No doubt many a corporate manager is struggling with this weighty issue—to accessorize or not to accessorize.

Here's a few highlights from GTE Mobilnet.

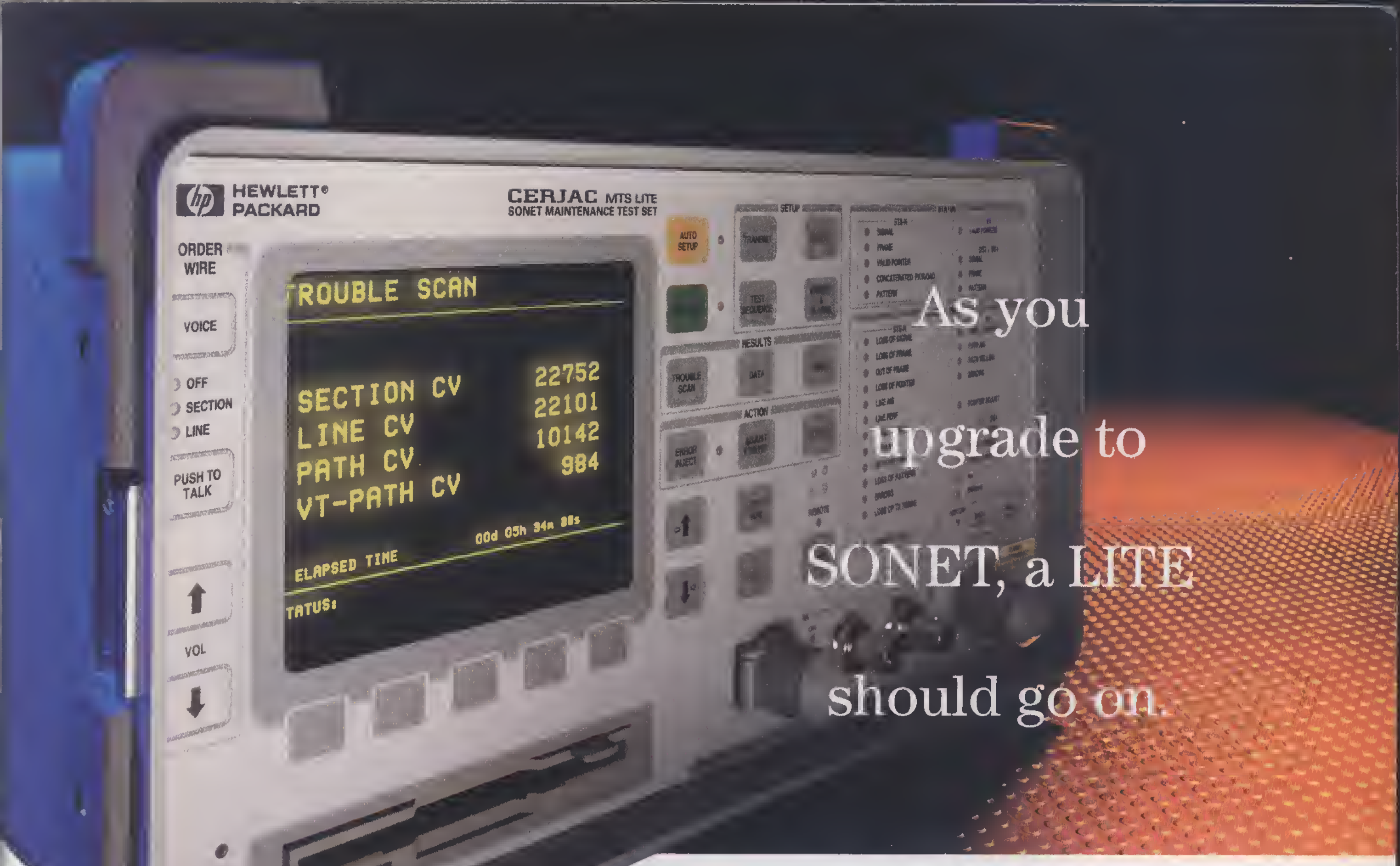
- Stirrup pants acceptable—leggings or leotards, not.
- City shorts/skorts/culottes (shorts masquerading as skirts) with blazer or jacket/vest/tunic OK—rural shorts or abbreviated mini-skirts (mn. skts.), not.
- Cotton shirts without ties, OK—what about polyester, silk, rayon, burlap?
- Boating shoes, OK—tennis shoes, not. No mention of football cleats.
- Denim shirts, yes—denim jeans/pants or skirts, nyet. That would be the fashion police coming between you and your Calvins. ■

WEB WATCH: SPIDER'S WEB

There's a Spiderman on the Web—and it's not Peter Parker. Bob Allison's "Spider's Pick of the Day" home page (http://gagme.wwa.com/~boba/pick.html) has become a must-see site for surfers looking for the jewel on the Net. Allison updates the page daily, which highlights one site worth viewing. "I pick pages that are new or timely, general interest but sometimes offbeat, that have something to offer the reader, that look interesting and colorful, and have some depth of content, as well as nicely organized links to other sites," Allison recently told *People* magazine's on-line edition.

Past picks have spotlighted Hootie and the Blowfish's home page and the Andy Warhol Museum. The latter (http://www.usaor.net/warhol/) includes exterior shots of the museum, a floor plan, exhibit information, directions to the museum in Pittsburgh and samples of the artist's work.

No word on whether the coffee shop serves Campbell's soup.



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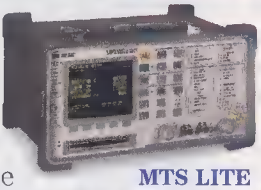

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PCS PROVIDERS APPEAL TO FCC FOR RELIEF ON RELOCATION COSTS

Deborah Eby
Washington Editor

Greedy microwave incumbents are stalling wireless market development to line their pockets, contend PCS licensees, who say the FCC must halt the gold-plating.

Incumbents counter that relocating to make way for PCS may cost more than licensees think and are concerned their interests could be trampled in the stampede to get wireless networks up and running.

Finger-pointing aside, the facts remain: Licensees must pay incumbents' costs to vacate the 2GHz spectrum set aside for PCS services. FCC rules allow incumbents two years of voluntary and one year of mandatory negotiations to strike a relocation deal. For PCS licensees racing against competitors, three years is an unacceptable wait.

"If these folks don't relocate, they've basically stopped the whole show," says a consultant who negotiates on behalf of PCS providers. "They've got quite a bit of time to tell the PCS service provider to go pound sand."

The relocation rush has driven up the costs incumbents are seeking to extract from licensees, says Mary Madigan, PCS issues manager for the Personal Communications Industry Association (PCIA). "Entities are getting ahold of the incumbents and getting them to ask for these large premiums and then taking a cut—making money off the process."

Madigan acknowledges "there was a general expectation that incumbents were going to be asking for more money than their systems were worth. There was also a general feeling that when [incumbents] negotiated for new systems, they'd be upgrading to digital, probably a much higher capacity than what they have now.

"But people are finding that we're going a lot farther beyond what the original expectations were about premiums," she continues. "Some people are seeing this as their lottery ticket. This is their retirement. I think you need to strike a balance there between what's reasonable and what's just greed."

PCIA has asked the FCC to consider shortening the negotiation period or capping premium payments.

PREMIUM IN EYE OF BEHOLDER

Groups representing microwave incumbents welcome airing the premium issue before the FCC, according to Sean Stokes, general counsel for UTC, The Telecommunications Association. UTC represents utility, gas and other microwave operators and has been accused of encouraging members to extract high relocation payments.

SOME PEOPLE ARE SEEING THIS AS THEIR LOTTERY TICKET. THIS IS THEIR RETIREMENT. YOU NEED TO STRIKE A BALANCE BETWEEN WHAT'S REASONABLE AND WHAT'S JUST GREED.

"To the extent there is some type of abuse going on out there, we don't think it does anybody any good," says Stokes. "We've been sending out strong messages for people not to do that because all it can do is hurt the process." He maintains UTC distributed information on PCS spectrum prices only to prepare incumbents should licensees attempt to strike quick deals.

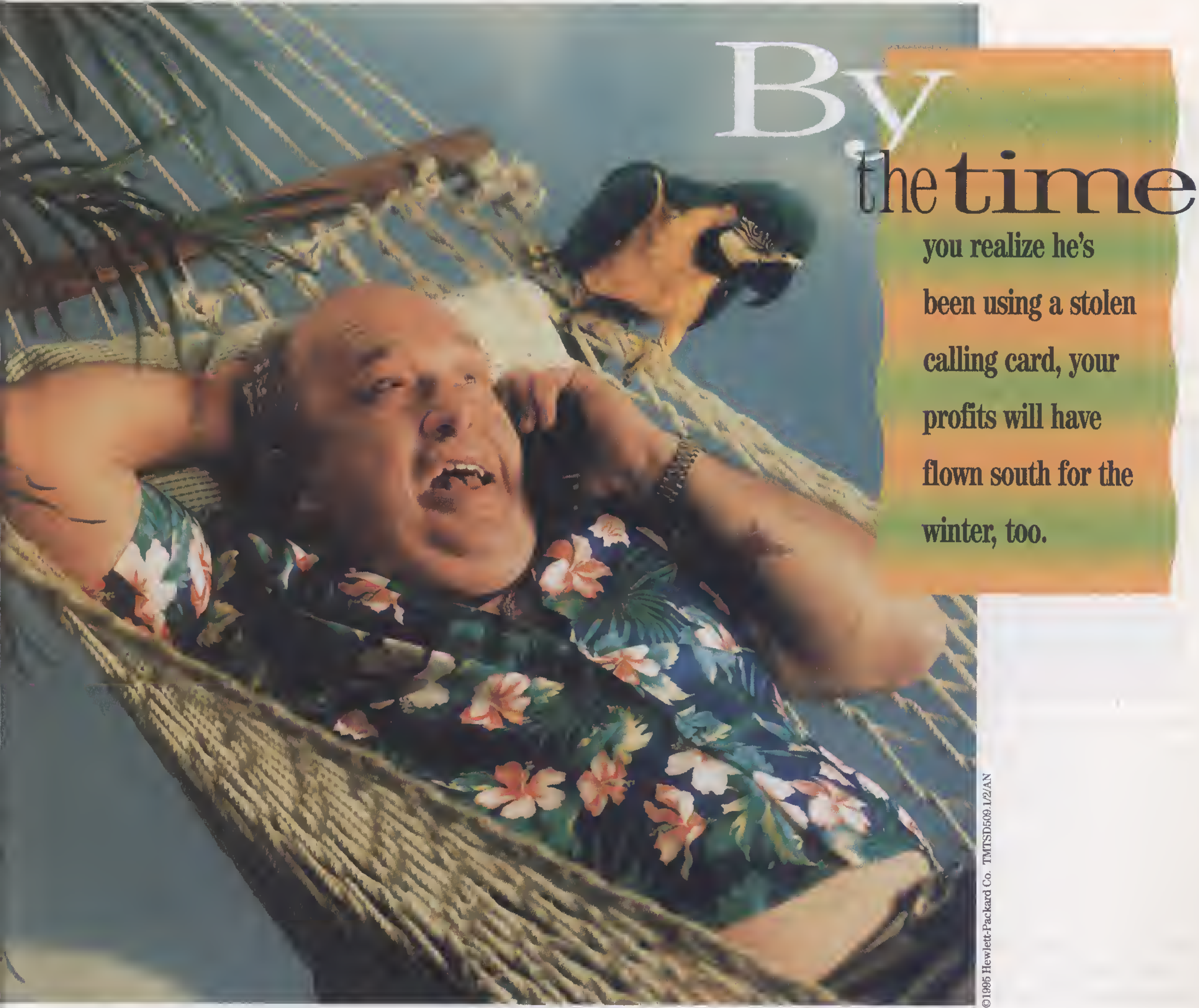
The PCS consultant maintains, however, that some microwave incumbents are nursing ambitions beyond operating an internal communications network. They demand new, all-digital equipment "that will let them be a competitive access provider and turn an historically private operation into a profit center. A lot of times, they don't have any money budgeted for these changes and they expect the PCS service provider to shell out."

Stokes notes that although most of the installed microwave base is analog, manufacturers' new lines are digital. "A lot of utilities are being told to get an equivalent system; you're not going to get analog, you're going to get digital because that's the equipment that's out there."

He adds that paying a premium for quick clearance is reasonable if costs are higher. "If the best engineering analysis says it's going to take 18 months to build the new [microwave] system and transfer over, and the PCS licensee wants to get up and running in 10 months, some incumbents are saying fine, but that's going to cost more." The microwave operator may have to lease temporary lines, bring in more engineers or hire an outside firm rather than use its own resources.

It's no surprise that microwave operators have nothing budgeted for such big changes, Stokes concludes. "We didn't start this. We were minding our own business, utilizing the spectrum. The PCS community says that they're going to make a lot of money off the spectrum we've been using as an internal tool. That's fine. But we have to come out whole."

"The PCS service providers are not out to screw the microwave incumbents," the consultant says in advocating FCC intervention on the premium issue. "The idea is to clear the spectrum." ■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CHIPS BRING ATM SPEED TO TWISTED PAIR FOR POTS PRICE

Vince Vittore
Associate Editor

For the past several years, vendors such as BroadBand Technologies, AT&T Network Systems and Fujitsu Transmission Systems have been trying to convince telcos and anyone else wanting to provide video services that fiber-to-the-curb (or switched digital video) architecture is the most effective way to go.

There have been some holes in their argument, though—mainly related to cost, says Gerry Pepenella, transmission IC marketing director for AT&T Microelectronics. "For an SDV system, what's been prohibiting it from being widely adopted has been the cost of the drop."

In the typical SDV system, drops consist of a coax cable carrying video and data from the curbside optical network unit (ONU) to the home, with a parallel copper drop for voice services. In some cases, carriers are opting to use asymmetrical digital subscriber line (ADSL) to run voice, video and data over copper drops.

Attempting to improve on both options, AT&T Microelectronics has developed a family of chips that can provide what it refers to as "ADSL on steroids" while dropping termination costs to near-POTS levels.

THREE-CHIP SET

Current ADSL-based products typically send 1.5 Mbps or 6 Mbps downstream. The new chip platform, Multipoint Broadband Access (MBA) consists of a three-chip set implemented in set-top boxes and another three-chip set in the ONU. It allows carriers to push 51.84 Mbps downstream to the home over existing copper drops. Additionally, it lets customers send payloads as great as 1.6 Mbps upstream.

The original idea, says Pepenella, was to use the existing drops, cutting one of the biggest expenses for video service providers. Before that could happen, several issues had to be addressed. "We set out first picking the appropriate frequency and finding out all of the impairments in the loop for that particular frequency."

After reviewing several options, the company settled on the 5MHz-26MHz range for downstream traffic. One reason: its compatibility with POTS and ISDN service, which is well below 5MHz. Additionally, AT&T Microelectronics didn't want to build a system that would run into premises-produced interference. "When you get into the home, there's lots of interference below 5MHz from things like hair dryers," says Pepenella.

WHAT'S BEEN PROHIBITING [SDV] FROM BEING WIDELY ADOPTED HAS BEEN THE COST OF THE DROP.

Sending video signals in that band also works well because splitters inside the home usually aren't specified to work with lower frequencies. In tests with bands below 5MHz, the company experienced losses in existing notch filters of 30dB or more. "Ultimately it was designed to integrate with what was there."

AT&T Microelectronics also decided early on to use carrierless amplitude/phase (CAP) modulation for the downstream traffic. "It's a very robust technology for dealing with the interference encountered in cable like this," says Pepenella of the algorithm that has been used in modems and ADSL systems. CAP technology also can deal with system realities such as open stubs in CATV systems, he adds.

Within the set-top, the chips perform the front-end modem function and produce separate MPEG-2 video and ATM data streams. In cases where ATM cells are delivered to the set, the chips first strip away the CAP coding, feeding the signal into a framing device that strips away the transport bits. A third chip then determines what type of traffic the payload contains and sends each frame to the appropriate output, says Pepenella.

On the ONU end, the chip set handles the framing of the outgoing data, unpacks incoming data and performs the modem function for four SDV channels. On the upstream channel, the chips use Quaternary Phase Shift Keying (QPSK) modulation. Part of the decision to use QPSK was based on its ability to handle bursty data.

Key to the chips' design is their ability to perform multiple functions. "There aren't a lot of things hanging off these chips," says Pepenella. "We're getting it down to the point that it's almost as low as the cost of a POTS termination."

This is particularly important at the ONU, where AT&T not only integrated several functions into a single chip, but reduced power consumption to .25 watts per channel on the transmission side. "You can not only put a lot of functionality in the chips, you won't melt everything down. That level of integration is very important here."

Several vendors—outside of BBT, of course—already have signed on to the technology and will use the sets in SDV platforms. Fujitsu Network Transmission Systems announced it would incorporate the chips in its FACTR Broadband Access System, which is being deployed by Singapore Telecom. Additionally, several customer terminal vendors including Divicom, Philips, Sony, Thomson and Zenith have said they will use the chips. ■

If he gets cut off one more time while trying to court a new client, you can kiss his business goodbye.

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DIGITAL SATELLITE SERVICES

SOUTHWESTERN BELL DISHES UP SATELLITE EQUIPMENT

RBOC enters digital broadcast satellite market through the back door, announcing agreement to sell dishes and set-tops in trial markets.

Patty Wetli
Associate Editor

Just when you thought convergence never would happen, Southwestern Bell Telephone goes and cuts a deal to offer DSS (digital satellite system) equipment to its customers.

Last month, the telco announced its agreement with DirecTV, USSB (United States Satellite Broadcasting) and Thomson Consumer Electronics to introduce DSS equipment in Little Rock, Ark., and Enid, Okla. The move tells customers "their phone company is now in the video business," says Thomson spokesperson James Harper.

But it shouldn't send the message that the RBOC is pursuing DBS in lieu of broadband video. "Absolutely not," says Jeff Weber, SWB director-digital satellite systems. "We're pursuing this because our customers want choice," and DBS is here now. But "we're not stopping or slowing down" [in the broadband arena].

Weber also stresses the company merely is providing equipment, not content. "We can't sell the service" due to regulatory restrictions, he says, and notes the telco is being careful to stay within the bounds of the law. "Our lawyers have scoured this."

Company strategists also scoured the country looking for the right test markets for the DSS dishes and set-tops. Little Rock and Enid were chosen because they typify SWB's "territory as a whole," according to Weber. By selecting a city and small town, the telco hopes to gauge market penetration in different-size markets. "We weren't looking for an abundance of high-techies," he adds. "We're not trying to skew results" but rather are aiming to get a feel for what customers really want.

Ideally, customers in Little Rock and Enid will take to DBS much as counterparts across the country who've eagerly snapped up equipment and signed on for service. Early DBS success has been well documented: 1 million units shipped in the first 10 months. "It took color TVs eight years to hit that," says Steve Blum, manager-consumer marketing at USSB. "This product just took off like a rocket."

Those stratospheric numbers caught Thomson off guard. "We thought we had a pretty aggressive number that first year" in planning for demand, says Harper. "We exceeded that by well over 100,000 units." Adds Blum, "RCA [Thomson] couldn't crank boxes out fast enough."

SWB IS TELLING CUSTOMERS THEIR PHONE COMPANY IS IN THE VIDEO BUSINESS.

While things are still "going real well," Harper notes initial fanfare surrounding DBS introduction has quieted down and sales have leveled out. "There was a built-in market of people who were really anticipating that product," he explains. Now Thomson and the content providers have to push DBS to the second stage and take it to non-videophiles. "This is just the beginning of that long road," he says. And that's where Southwestern Bell comes into play.

The RBOC's reputation "definitely lends more credibility to an altogether new product and technology," says Harper. And SWB can throw its considerable marketing machine behind the service—make that equipment—tucking promotional literature in with telephone bills. "We cannot push the service," Weber says. "It's OK with us if they just want the equipment." But the equipment provides access to the service, he qualifies. "To sell the equipment, you've got to tell people what it does."

WIN-WIN-WIN

It's a win-win-win situation all the way around. Thomson gains yet another distribution outlet for its product. "Our objective is to sell to telcos and cable TV providers," says Harper. The company aims to be the "world's leading provider in digital set-top boxes," so the more boxes and dishes SWB peddles to customers, the closer Thomson is to reaching that goal. (A recent contract awarded by the TeleTV venture won't hurt, either.)

From USSB's perspective, "We think it's going to be great for us. The more boxes that are out there, the better off we'll be," says Blum. Obviously, SWB's two test markets "aren't going to make or break us," he says. But if the RBOC decides to expand its program region-wide, that would be the equivalent of signing on a major consumer electronics chain.

SWB's Weber doesn't rule out the possibility of a wider-scale rollout, though no plans are on the books just yet. "In six to

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12 ☐ Bell Communications Research
20 ☐ GTE
30 ☐ Independent Telephone Company

OTHER SERVICE PROVIDERS
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50 ☐ MSO (Two or more Cable TV Systems)
55 ☐ Independent Cable TV System
60 ☐ Cable TV Contractor/Engineering Firm
65 ☐ Other Cable
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190 ☐ Cellular Operator
195 ☐ PCS/PCN Operator
205 ☐ Other Wireless
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185 ☐ **Competitive Access Provider (CAP)**
220 ☐ **Telecommunications Reseller**
170 ☐ Other Carrier
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135 ☐ **CONSTRUCTION CONTRACTOR**
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400 ☐ **OTHER**

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12 ☐ **Engineering** (Network Designer, Engineer, Technician)
13 ☐ **Management** (VP, General Manager, System Manager, Manager, Director)
3 ☐ **Corporate Management** (Chairman, Owner, President, Partner, Executive/Senior VP/Director, Treasurer, CFO, COO)
4 ☐ **Legal, Financial, Regulatory or Processing Services** (Director or Manager of Rate Planning & Administration, Settlements & Contracts, Service Costs, Methods, EDP or IS Operations)
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12 ☐ Bell Communications Research
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30 ☐ Independent Telephone Company

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"We are very good at customer service," installing and maintaining technical services, Weber says. And installation will be a main focus of its program, something Sears and Circuit City may not do. "There is self-install," he says, "but we certainly don't recommend it." While acknowledg-

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But Thomson's Harper believes there may be a hidden agenda on the part of Southwestern Bell. "If I'm the telephone company, I'm looking ahead to delivering video services over my own lines," he says.

When selling broadband video, it won't be a leap of faith for customers to accept the telephone company as a video provider. "The base will already be there" thanks to the DSS equipment program.

As long as Thomson set-tops are included in the equation, Harper doesn't care if a company is selling DSB, VDT or CATV. Under any scenario, he says the big winners will be "the people who sell the programming." ■

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THE VIDEO BUSINESS.

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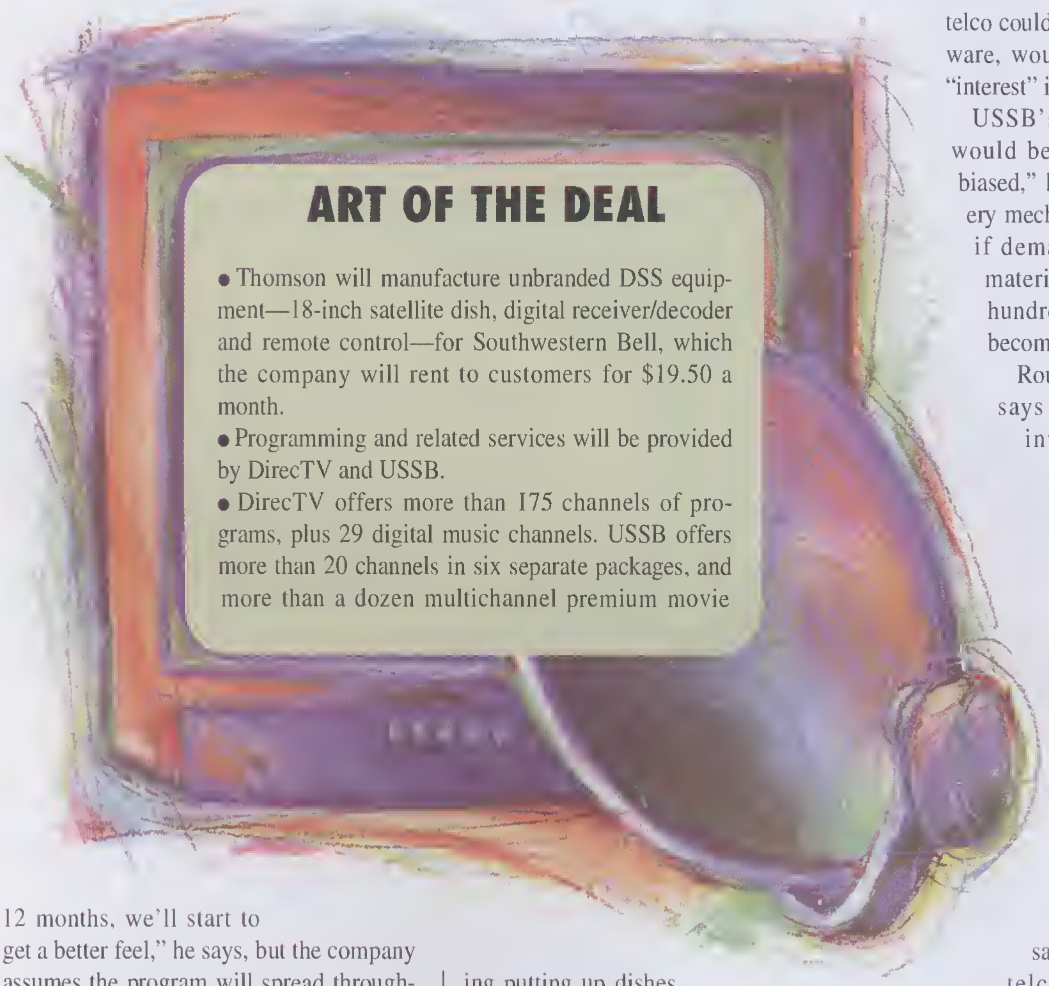

ART OF THE DEAL

- Thomson will manufacture unbranded DSS equipment—18-inch satellite dish, digital receiver/decoder and remote control—for Southwestern Bell, which the company will rent to customers for $19.50 a month.
- Programming and related services will be provided by DirecTV and USSB.
- DirecTV offers more than 175 channels of programs, plus 29 digital music channels. USSB offers more than 20 channels in six separate packages, and more than a dozen multichannel premium movie

12 months, we'll start to get a better feel," he says, but the company assumes the program will spread throughout the telco's territory over time.

Though it's not exactly getting in on the ground floor and is taking a cautious approach, SWB is high on DBS. "We looked at lots of other technologies," says Weber. "For us, it's [DBS's] the right way to go." He points to digital video, CD-quality sound and availability as major selling points. "Direct broadcast is available in every square inch" of the country, he says. "If you get the equipment, you can get it [the service]." But the arrangement's a two-way street; SWB believes it brings some important qualities to the party as well.

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To familiarize consumers with DBS, the RBOC has set up a kiosk in *the* mall in Enid and two in Little Rock to demonstrate the service. "The digital quality [of DBS] is simply exceptional," says Weber. "It's important that people see it." Customers can place equipment orders on the spot and the company will guarantee delivery dates, usually within two or three days—faster if necessary. "We'll work with them," he says, but if it's a Saturday evening and someone wants their NFL Sunday the next morning, "I don't want to make promises."

Weber remains similarly guarded about SWB's ultimate plans for DBS. If the telco could offer more than just the hardware, would it? There might be some "interest" in that option, Weber allows.

USSB's Blum thinks that interest would be justified. "Obviously I'm biased," he says. "We think our delivery mechanism is the way to go." And if demand for interactivity never materializes, the case for beaming hundreds of channels via satellite becomes economically compelling.

Rounding off the numbers, Blum says USSB, RCA and DirecTV invested about $1 billion to reach roughly 100 million households, which averages $10 per home. "[Telcos] can't roll a truck out for $10 a household," he says, much less run fiber to a serving area at that price.

HIDDEN AGENDA?

As further proof of DBS's desirability, Blum points to MCI, which is trying to get in on the action. "They're filing all over the place," he says. Should SWB or any other telco make a similar move if allowed, "I'd applaud them for their good sense," but he wouldn't exactly cheer them on. Leaving such speculation aside, he says of SWB, "Right now they're our friend. They're helping us build our business."

But Thomson's Harper believes there may be a hidden agenda on the part of Southwestern Bell. "If I'm the telephone company, I'm looking ahead to delivering video services over my own lines," he says.

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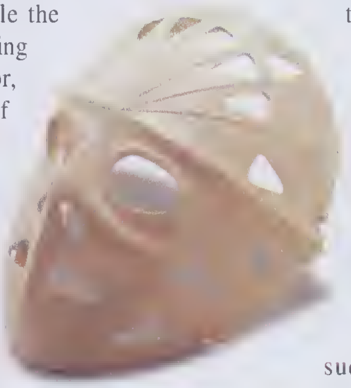
Circle 121

■ MARKETING

U S WEST PLAYS DATABASE BALL

Patty Wetli
Associate Editor

Who attends World Wrestling Federation "matches?" Who forks out money to watch the WWF on pay per view? While the answers might make an interesting study in deviant social behavior, the information's actually part of a new initiative launched by U S West Marketing Resources Group.



The unit recently announced an alliance with The Bonham Group, a national sports and entertainment marketing firm, in which U S West will offer database marketing products, services and consulting to professional and collegiate athletic teams and associations.

"This is just a natural progression using our strengths and expertise," says U S West spokesperson Sharon Price. She points to the company's history of marketing and bringing together buyers and sellers, particularly through White and Yellow Pages directories.

"We've become database experts," adds Maggie Hecht, director-database marketing. And now the RBOC's found a surprising niche to which it can sell that expertise and wring out extra revenue.

Hecht notes that the sports and entertainment industry is "not as far along" as, say, catalogers or credit card companies when it comes to segmenting information and tailoring marketing campaigns to specific customers.

"We are meeting with them to explore how a database could work for their business," Hecht explains. "We'll design a program for them" that might result in higher attendance at events, for example.

She notes that many of these teams and organizations already have what it takes to construct a database. "They keep records" of things like season ticket holders "but they don't use it to market."

To promote a special event, a team such as the Colorado Rockies might send out a mass mailing according to zip code or buy radio or TV time for advertising. This "spray and pray" method might reach a huge audience but isn't particularly cost effective, according to Hecht.

But by building a database and using that information to put together a prospect list, the team could "tag who's going to games" and send out a flyer or brochure to those most likely to respond. In this manner, U S West is taking existing information and enriching it, managing it and adding value, she says.

The WWF has been one of the venture's first clients. They want to know "who are their best customers," says Hecht. So U S West will help the WWF build a database that tracks the type of person who goes to events, buys merchandise and subscribes to the organization's magazine. By looking at overlap in these various categories, U S West can help the WWF enhance its product by tailoring its activities to meet the needs and demands of these individuals.

Though not involved in the WWF deal, The Bonham Group will be integral to U S West's success in this new arena. "They have lots of contacts in the industry," says Hecht. And "they understand what sports and entertainment companies confront as they market."

One of those challenges is an increase in competition. "Marketing has become more competitive in sports," notes Hecht. Football and baseball are no longer the only games in town, not to mention all the sporting events on TV and "add entertainment on top of that," she says. "Their competition is much broader." So these teams and organizations have to become more adept at marketing.

Ironically, Hecht likens teams' plight to that of cable TV operators. Both "tended to be monopoly companies," she says, and "didn't have to do a lot of marketing." Where the Denver Broncos now compete with the Colorado Rockies, cable companies find themselves going head to head against various opponents, including telcos.

U S West's marketing resources group will be working its database magic in Omaha for its parent company, but would consider doing the same for a CATV provider where market interests don't conflict. "It's a great example of competitors becoming partners," says Hecht.

And of her CATV brethren, she adds, "There cannot be a better time to understand customers." A database might track who orders the sports package versus the family option.

"If you consistently watch sports," the service provider could announce a pay-per-view boxing event, "not an upcoming romantic movie." ■

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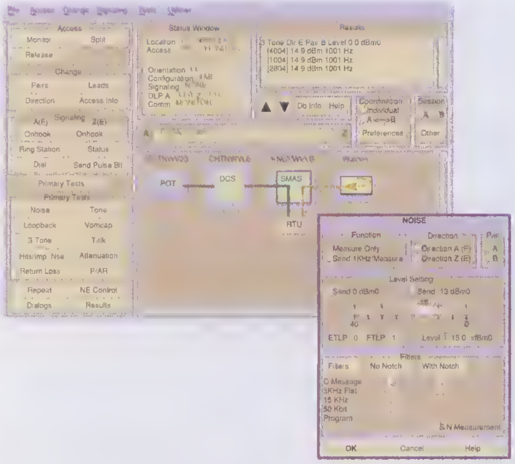

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ADVANCED INTELLIGENT NETWORK

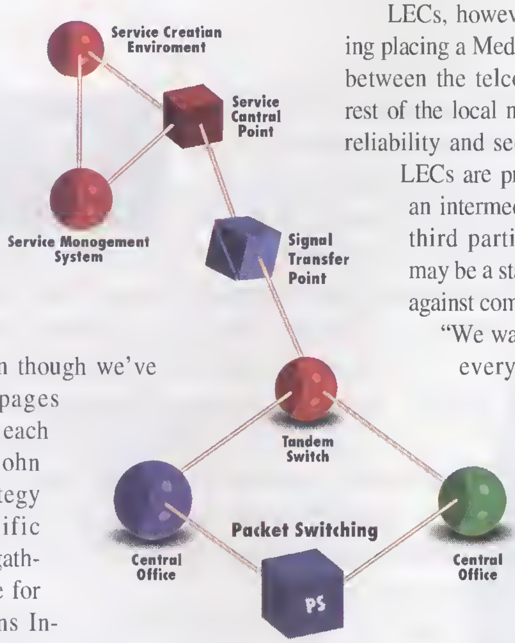
OPENING AIN

LECs and third-party carriers squabble over access to network intelligence.

Deborah Eby
Washington Editor

Third-party carriers are anxious to tap into the revenue-generating features served up by telcos' Advanced Intelligent Networks (AINs). But how fast and how far third parties reach into the local network is a hot-potato issue that may be tossed to the FCC to resolve.

AIN ARCHITECTURE



LECs are advocating a phased-in approach to third-party AIN access, citing reliability concerns and complex testing requirements. "No vendor has taken the same view of what AIN should be even though we've got thousands of pages that try to describe each and every item," John Sherbert, AIN strategy manager for Pacific Bell, told a recent gathering of the Alliance for Telecommunications Industry Solutions (ATIS).

"You can create a service rather quickly, but we have to test that AIN capability against every little thing that lives in that network today. Because of the tremendous number of parameters involved, we find a lot of unexpected behavior." Since AIN equipment isn't deployed uniformly, third parties often end up with "the least common denominator" in services.

The first step toward "Open AIN" is granting third-party access to the Service Control Environment (SCE)—graphical user development tools used to create AIN services, explains Scott Schaefer, BellSouth executive director-AIN Integrated Business Unit. Third parties will be screened at the RBOC's Service Management System.

Phase two will be direct interconnection between telco and third-party Service Control Points (SCPs), which house application programs for new services and centralized network operation functions.

LECs, however, are considering placing a Mediation Point (MP) between the telco's SCP and the rest of the local network to ensure reliability and security. Although LECs are promoting MPs as an intermediate technology, third parties suspect they may be a stalling mechanism against competing carriers.

"We want an interface to everything, we don't just want an interface to an SCE or even an SCP," says Frank Shaffer, MCI's senior manager-advanced services development. "Mediated access creates a logic bottleneck because I have to go through the SCP," he explains. "What if you decide not to allow me on a certain functionality to go through your SCP for a very valuable feature? That would shut me out." Not to mention the call delays caused by the signal moving from one network to another.

Pending reform legislation would allow RBOCs into the IXC business, compounding competitive concerns. "Do I want to take my Friends and Family database and put it in all the SCPs across the country?" Shaffer asks. "I don't think so, because if you get into the long distance business, guess what? I just handed you my customer base."

He contends MPs will work only if LECs must operate through them as well. "If there's a mediated point [so] that everybody's bad [i.e., everyone experiences delays] instead of selective good, that gets rid of a lot of the issues that we looked at with mediated access."

The FCC released its proposals for Open AIN in 1993 and plans to issue final rules this winter, according to Kathleen Levitz, deputy chief of the Common Carrier Bureau. She notes pending telecom legislation requires the commission to referee third-party access to advanced network features.

The FCC tentatively concluded that existing market incentives are insufficient to prod LECs toward Open AIN, and some type of phased-in mediated access is in order. Since then, however, AIN technology has improved and debate among carriers has heated up, notes Levitz.

A group of LECs has proposed that a two-year, industry-wide mediated access study precede any final rulemaking. AT&T insists the FCC mandate unmediated third-party access, and Ameritech contends commission involvement no longer is necessary.

Whatever the FCC decides, network reliability will be a top priority, Levitz declares. AINs aren't necessarily more risky than current networks, but "the average reliability on the existing public switched telephone network is 99.9%. AINs present new features that will operate in a multi-vendor environment. This is something new."

Weighing heavily in commission deliberations will be a study due in December from the FCC's Network Reliability Council that surveys industry experts on AIN's potential risks and how to minimize them.

Levitz warned ATIS members that "we must work with you now, because if we learn too late of a potential threat to the public interest arising from how a new AIN-based service or functionality is being deployed, our response may necessarily have to be heavy-handed." ■

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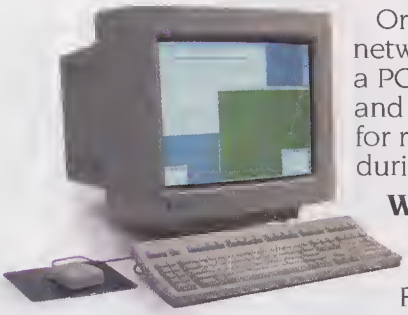

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PERSONAL COMMUNICATIONS SERVICES

GSM CARRIERS ROAM ON THE RANGE

What they lack in licenses, GSM PCS carriers hope to gain through roaming arrangements to offer customers near-national coverage.

Patty Wetli
Associate Editor

Analysts may disagree about its viability, but several future PCS carriers are doing their best to ensure GSM has its day in consumer court.

So what if the Sprint coalition and PCS PrimeCo's alliance of three RBOCs and AirTouch are backing CDMA, or that AT&T has thrown its wireless weight behind TDMA. GSM's proponents insist they made the right choice in selecting an air interface that's already a standard in 70 countries worldwide.

"GSM's proven, it works, we know it works, and it works very well," says Lou Saviano, spokesperson for Pacific Bell Mobile Services (PBMS). "You can't get CDMA today, and it's important to get to market as fast as we can. It's important to get out and establish ourselves."

CRITICAL SERVICE - Pac Bell believes New York will be an important roaming area for its customers.

Pac Bell's facing a double-edge sword: it's been out of the mobile business since spinning off AirTouch, and it also will be competing against the Sprint enterprise, which will be able to offer customers a near-national network. Saviano is less concerned about AirTouch. "We know what AirTouch is, but not everyone does." Pac Bell, on the other hand, has instant name recognition. "It's not like starting off with a brand-new name," he says. PBMS will be offering wireless services through a "company Californians are familiar with."

But the RBOC can't dismiss Sprint and its army of cable TV providers quite so easily. Which is why the company is joining forces with other GSM carriers—BellSouth, Omnipoint, Western Wireless and Powertel. Apparently there's safety in numbers.

Those five carriers cover more than 35% of the U.S. population. "Basically, what we're looking at is entire U.S. coverage," says BellSouth spokesperson Al Schweitzer. "It's just a matter of time before that fills out." Saviano adds, "We're trying to build and expand and solidify a national footprint."

TECHNICALLY NATIONAL

By forging roaming arrangements, these carriers technically can offer subscribers coast-to-coast coverage, but there are a lot of gaps in between. Sure, Angelenos can take their PCS handsets to the Big Apple (Omnipoint), as long as they don't make a pit stop in Chicago. And BellSouth customers in Knoxville can roam, roam on the range in Salt Lake City (Western Wireless), but Atlanta—maybe not.

"GSM is in trouble," says Barry Goodstadt, director-wireless industry consulting for A.T. Kearney. "The question is, where can you use GSM? Your GSM phone can be useful in North Carolina, California and Canada maybe."

Curiously, the carriers that chose GSM are some of the most geographically isolated. Omnipoint has one license, BellSouth two, Western Wireless is scattered (Portland, Salt Lake City, Des Moines, Oklahoma City), and Pac Bell staked its claim to California. "Don't be misled by blotches on the map," says Saviano. Geographically, the areas may seem small, but the MTAs are dense and highly populated.

Both Saviano and BellSouth's Schweitzer say their companies made conscious decisions to bid small and expand later. But by choosing GSM, they seem to have limited their options.

Not so, says Mark Lowenstein, director-wireless research for the Yankee Group consultancy. "We think that in every major market there will be GSM, TDMA, CDMA."

Let's not forget, the fat lady has yet to sing. The C-band auctions are on the horizon and designated entities such as Go Communications have declared their choice of GSM.

"Just because of PrimeCo and Sprint" doesn't mean CDMA has scored a knockout punch, says Lowenstein. He anticipates the Chicago BTA, for example, will be a "hotly-contested DE market" in the next round of auctions, with a GSM carrier likely grabbing a license in the Windy City.

Pac Bell, for one, will be watching the C-band auction closely. "We certainly want to work with other GSM providers,"

*continued on page **30***

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Circle 117

GSM

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says Saviano. "We want to encourage others to use GSM."

Lowenstein believes that in lieu of a national network a la Sprint, there "will be an association of companies who join together in a 'roaming club'" and possibly brand together like Cellular One. But he questions any urgent need to provide coverage from sea to shining sea. "Roaming right now is only 5% of calls in cellular," he notes.

And Saviano concurs that roaming might not prove a sticking point with subscribers. "You want to have [roaming] agreements where your people are going to go. Obviously New York is important" for Californians. "You want to have coverage in as many places as possible, but some are more important than others." Maybe residents of the Bay Area have no intention of ever visiting Baton Rouge.

Roaming is "not a huge factor on an everyday basis," says Saviano. He believes Pac Bell will meet most of its customers' needs simply by allowing them movement within California. And the company intends to take care of the competition by "differentiating from what cellular is today" and offering a "high-quality wireless service, an attractive price and a greater array of features." What that might mean is anyone's guess. "Our people are guarding rather jealously their plans and services," he admits.

BELLSOUTH: STRATEGY UNCLEAR

BellSouth's strategy appears even more nebulous. Though the RBOC nabbed the seventh-largest license with the Carolinas at one of the lower prices per POP, Lowenstein questions the wisdom of later decisions.

For starters, the telco's cellular and PCS interfaces are incompatible, meaning subscribers will have a tough time moving about in-region. The telco seems to be keeping its PCS subsidiary at "arm's length," he says.

That's where it's keeping other GSM carriers as well. Schweitzer discounts Lowenstein's joint branding theory, saying BellSouth "still enjoys a healthy business independence" from other carriers.

And though Saviano says Pac Bell is interested in sharing market research, developing products and pooling resources to purchase equipment with its GSM compatriots, BellSouth seems content to cooperate on roaming alone. "When we picked our vendor, we didn't check with Pac Bell," says Schweitzer.

If one thing's certain in this industry, it's uncertainty. "It's still early in the game," says Saviano. "We're putting together a puzzle." By choosing a technology that's ready to roll and cobbling together a widespread roaming network, GSM carriers may have the last laugh on the big, bad CDMA wolf. "Stay tuned, by all means," he concludes. ■

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NUMBER PORTABILITY

ILLINOIS SKIPS TESTS, PICKS LONG-TERM PLAN

Vince Vittore
Associate Editor

As an open local loop appears inevitable, states are trialing solutions for local number portability.

But the Illinois Local Number Portability (LNP) Workshop is skipping this phase altogether, having chosen a long-term architecture.

"This is what puts us so far in front of the pack," says Terry Appenzeller, vice president-open market strategy for Ameritech and a co-chairperson of the LNP workshop. "This is the real thing."

Under a plan unanimously approved by Ameritech, Cellular One, MCImetro, Sprint and GTE, the workshop has decided on an architecture, vendors and timetable for implementing true local number portability.

The preferred architecture uses a database structure and was developed by U.S. Intelco Networks and Stratus Computer for a Seattle-area trial. Using very large regional databases, service providers can offer both carrier-based portability, which lets customers keep their numbers when switching carriers, and location-based portability, which allows customers to keep their numbers when they move geographically.

The workshop originally considered four proposals, says Chris Walker, manager-client relations with U.S. Intelco Networks. Of the four, the Intelco/Stratus proposal and one from AT&T came closest to meeting the workshop's requirements, she adds.

Both solutions mapped customer-dialed numbers to a routing number. In the Intelco/Stratus solution, though, when a ported number is dialed, the database is queried for a carrier port code (CPC). The CPC combined with the NXX tells the originating switch where the call should be routed.

Databases in Illinois will cover the Chicago LATA initially, with only those NXX codes that serve competitive locations populating the database. For Ameritech, that means developing a database that encompasses as many as 254

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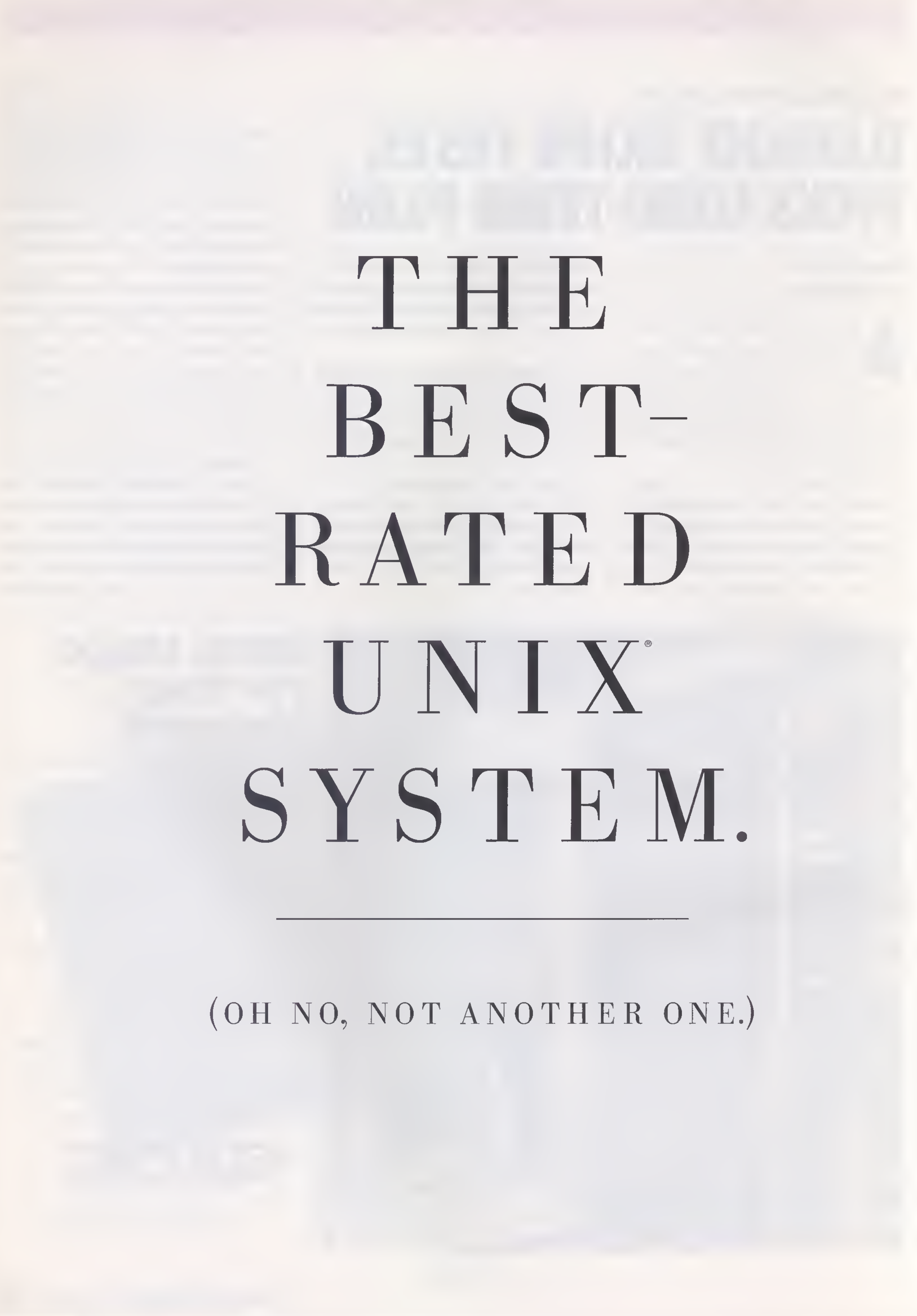

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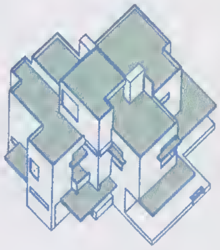

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Circle 118

NUMBER PORTABILITY

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switches. As portability expands to different locations and perhaps wireless networks, more databases likely will be added.

But national databases probably won't ever materialize because of the sheer size that would be required, says Appenzeller. "You have to remember, the regional database is going to be about 100 times bigger than the 800-number database. We may eventually see the regional databases hooked together."

However, it would be impractical to deploy infrastructure where no competition exists, adds Walker. "It makes a lot more sense to deploy the databases where there will be demand. So I'd imagine that we'll start with the top 10 metro areas and it will roll out in islands."

Walker admits the chosen architecture is the most complex of those proposed, but its ability to offer location-based portability was key in its selection. A solution proposed by MCI, for example, only gave customers carrier-based portability.

"It has the least immediate impact on the operational support systems," Walker says of MCI's proposal. "But it's assumed, and correctly so, that the industry will move to a location portability solution."

Initially, however, the MCI proposal will be used as a framework for an interim solution. Even those pushing for location-based portability say the full solution will not be available for two to three years. Until then, the workshop will continue looking at several options including offering only carrier-based portability. "The goal is that it has to be as flexible as possible," says Walker.

WHO PAYS?

The workshop first must define an implementation plan and select a neutral third-party data administrator for database maintenance. One of the most critical issues will be how to pay for the network. No one has definitive figures for the total cost, but initial estimates for Ameritech's Chicago LATA are between $50 million and $60 million. That amount could drop dramatically if carriers band together, says Appenzeller. "I don't know that it's that expensive because we may get some volumes here."

Even more important than the price tag is whose name is on the bill. Currently, several widely varying proposals suggesting how to pay for the plan have been presented to the workshop.

Eventually, the Illinois Commerce Commission probably will have to step in and make a final decision, according to Appenzeller.

Still, the decision to move forward and skip the trial phase is encouraging to all participants, he concludes. "What's unusual about ours is we're getting something done. Some of the other states are like debate clubs." ■

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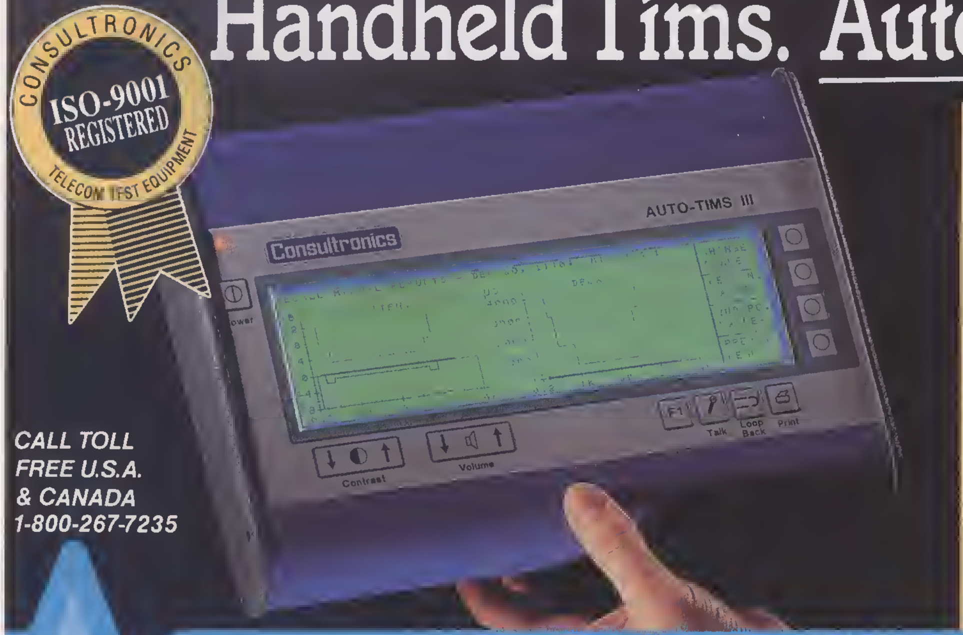

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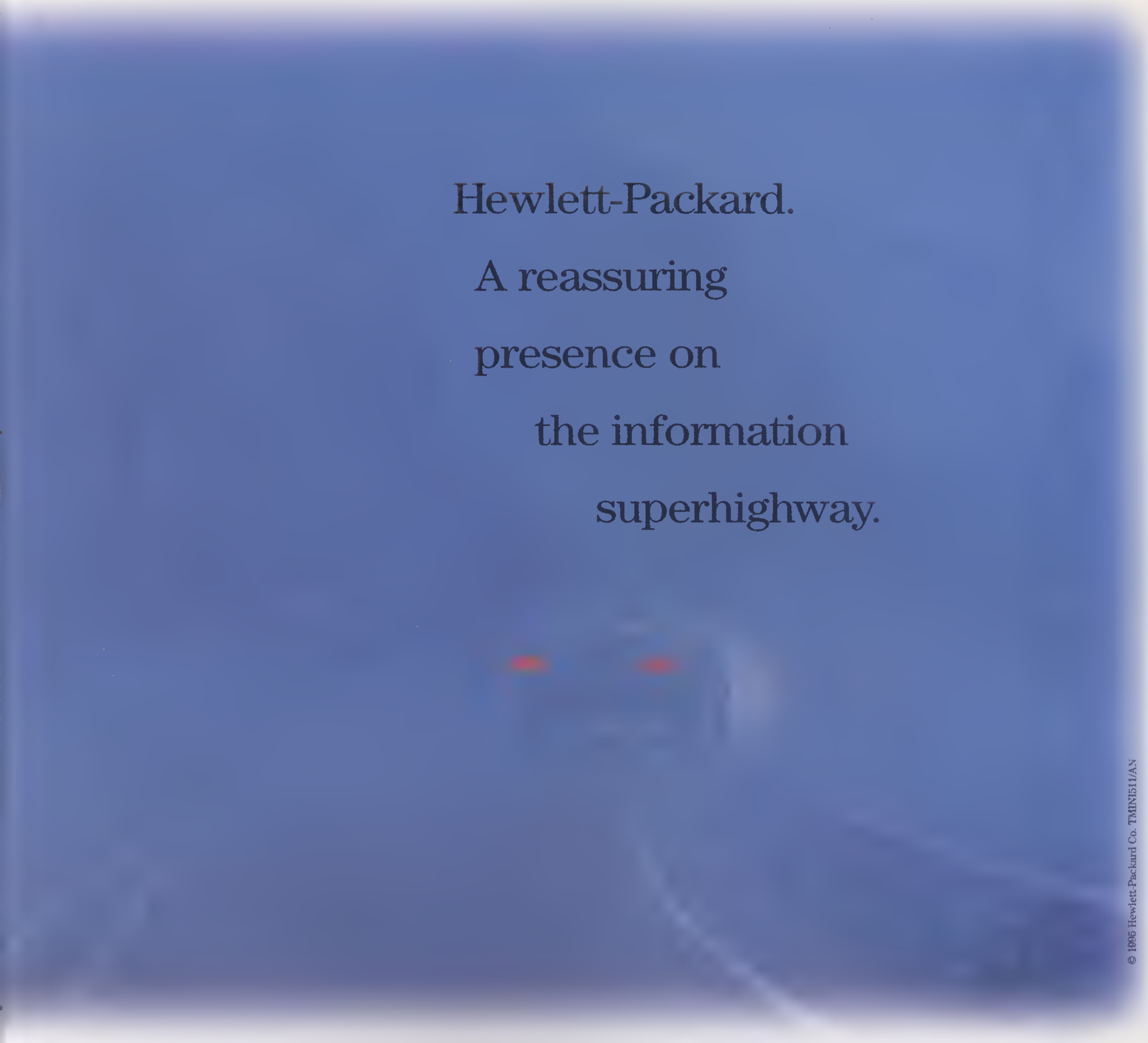

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COMPETITION

CUT LOOSE

By the end of next year, AT&T Network Systems will be on its own. But it may be much longer before there's major impact on other vendors.

Eric Krapf
Managing Editor

AT&T's split-up shocked the telecom industry and will revolutionize vendor-market dynamics by opening the massive AT&T services company to fuller competition and by letting RBOCs buy equipment from the soon-to-be-former AT&T Network Systems without fear of subsidizing a local-loop rival.

That's one way of looking at it.

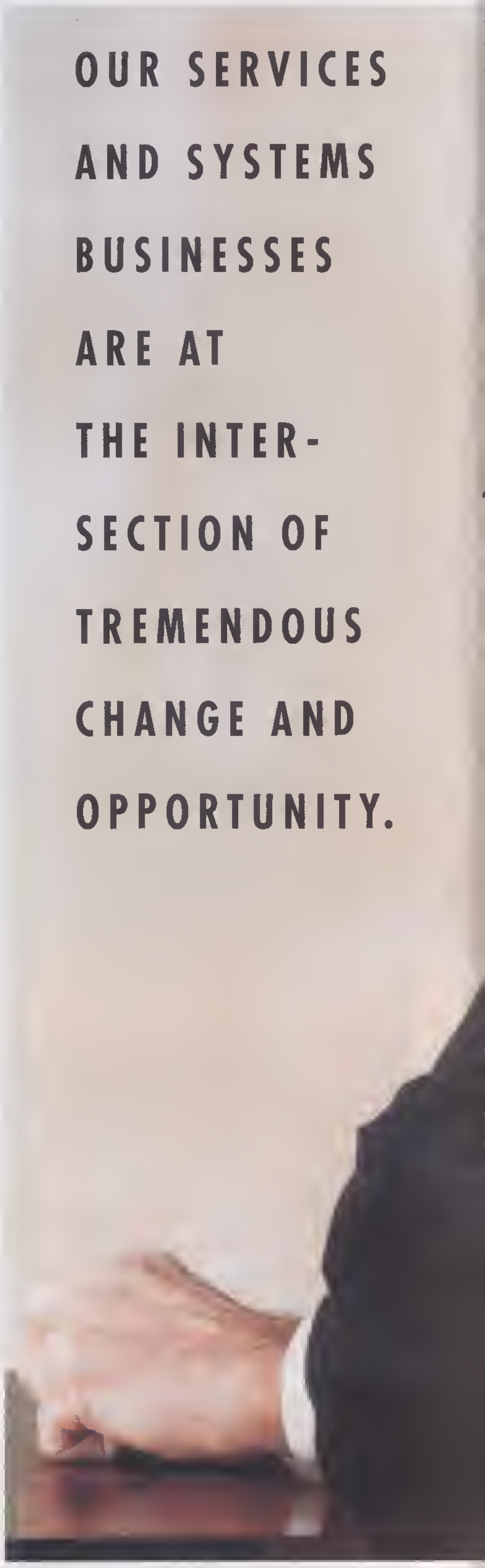
However, few industry members or observers believe any real market shifts will occur in the near term. Though AT&T's services company will be freer to buy from vendors other than Network Systems, some say personal loyalties will linger—and matter. And while RBOCs may have been uncomfortable with Network Systems' AT&T ties, it's debatable how many actually would have shunned the equipment manufacturer. Plus, observers say, the split-up wasn't even that much of a surprise.

Network Systems' largest competitors agree the three-way split represents a chance for them to break into the business of supplying AT&T's communications services company. Hearkening back to Divestiture, a Nortel spokesperson notes the Bell companies were "all charging ahead" to distinguish themselves from the old AT&T; he believes the same process will repeat itself with the new break-up. There's "no reason why we shouldn't" get some AT&T business, he says.

ADC is even more optimistic. "The good news is a huge new customer comes into the market that previously wasn't available to us," says Jack Reilly, vice president-business development. "It's like all of a sudden you have five MCIs entering the market."

But vendors are realistic about how long it could take to break through with AT&T services, acknowledging they're looking at years rather than months after the expected yearend 1996 goal for finalizing the split-up.

Some remain skeptical the new AT&T will kick the Network Systems habit. "In



OUR SERVICES AND SYSTEMS BUSINESSES ARE AT THE INTERSECTION OF TREMENDOUS CHANGE AND OPPORTUNITY.

the early years—and I mean years—there's probably going to be a psychological relationship," says Bell Atlantic spokesperson Eric Rabe. He saw this "corporate mentality" in the form of persistent loyalty to AT&T in the Bell Atlantic of the late '80s. And if you think in the intervening years the industry's become less sentimental about such associations, think again, says Rabe.

Some analysts tend to agree. "It gets down to the people factor," says Joe Fristensky, industry manager-telecom for California-based Frost & Sullivan. "You can put as much as you want on paper, but when it comes down to it, people do business with people, and with people they know and trust."

Not that we're talking about a Bell-head mentality. John Ryan, principal of ryan.hankin.kent, believes AT&T won't delay in making overtures to the larger vendor community. "I imagine they'll start going through the motions immediately," Ryan says. Where AT&T has new builds, "There'll be open tenders and they'll be sent to all the usual suspects." But he agrees it'll "take quite a while" for Network Systems' share of AT&T's business to decline significantly.

"There's some belief that Network Systems is better equipped to sell to the larger market than AT&T the long distance carrier is to buy from suppliers other than Network Systems," which Ryan observes is "already a very aggressive competitor in challenging for the business of other carriers."

RBOC MARKET

And that aggressiveness was becoming a problem, concedes Gerry Butters, president-global public networks for AT&T Network Systems. "If one of our customers believes buying Network Systems equipment was putting money in the AT&T war chest, they're going to bias their decision against us," he says. Under the former structure, Network Systems was handicapped in its efforts to compete for these customers.

"Our front-line sales people felt we

continued on page **40**

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AT&T

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couldn't win the business on our business value proposition alone," Butters says, though he has no concrete example of Network Systems losing business due to its affiliation with AT&T's carrier services.

But such a scenario was just a matter of time, says Ryan. Several RBOC executives "made clear their strong displeasure" about AT&T taking anti-LEC positions on deregulation while "at the same time the president of AT&T Network Systems was knocking on the door, trying to sell some of his boxes."

And how do RBOCs feel now? "It does make us a little more comfortable using AT&T's equipment," says Bell Atlantic's Rabe. "To some degree, you feel a little better if the communications and manufacturing businesses are split apart."

But there's still a major sticking point: interoperability. "We're basically at the mercy of AT&T for upgrades," Rabe says. In cellular, for example, carriers have paid a premium to get AT&T to make its networks interoperate with some outside components. "Maybe that's just good marketing, I don't know, but that's the kind of thing they can do and do do.

"They're always talking about the bottleneck of the local loop," Rabe says. To convince RBOCs things truly will be different after the split-up, the new Network Systems must be willing to break "the bottleneck of the manufacturer."

Vendors admit to playing on RBOC fears about subsidizing AT&T through purchases from Network Systems, but they say having that argument pre-empted by the split-up won't affect sales greatly.

"I will not say we have not made use of it as an argument in our sales strategy," says Paul Carroll, director-market planning for Siemens Stromberg-Carlson." It has never been a cornerstone."

ADC's Ryan saw the subsidizing-your-competitor strategy possibly bearing fruit in the future, but as things stand now, "We don't feel we were getting much business because of the fear factor."

To the extent RBOCs do shun Network Systems, it's likely to be attributable more to momentum and competition than antipathy or fear, Ryan says. Fact is, the open market's pretty crowded: for example, six vendors have OC-48 products: "That's a lot. That's really quite a few."

In its favor, Network Systems is an approved vendor "of almost everything at almost every RBOC," Ryan notes. Even more compelling, according to Bell Atlantic's Rabe: "One of the great things AT&T has going for it is they make superior stuff." Bell Atlantic stuck with AT&T equipment based on quality, despite its own position as one of the RBOCs most committed to besting AT&T in the regulatory arena.

PITFALLS FOR NETWORK SYSTEMS

While AT&T naturally presented its split-up as beneficial for the three new divisions and the market, Ryan notes the situation isn't without pitfalls. "This is not a win-win-win," he says. "It's not all good news."

A major issue as AT&T's service and equipment divisions untangle: technologies needed by both entities. Though he stresses he possesses no inside information on specific bones of contention, Ryan cites one example that may typify this issue: algorithms for cross connect software. Network Systems could say it needs that software to sell the best possible equipment; the services company could say it needs it to provide reliable, self-healing networks to compete with the likes of MCI and Sprint.

Network Systems CEO Rich McGinn says the majority of AT&T's patents will end up with the services company, though

> IT DOES MAKE US A LITTLE MORE COMFORTABLE. TO SOME DEGREE, YOU FEEL A LITTLE BETTER IF THE COMMUNICATIONS AND MANUFACTURING BUSINESSES ARE SPLIT APART.

WHAT'S AHEAD

WHERE THE PIECES WILL FALL

Most of Bell Labs will become part of the new equipment company to be spun off from AT&T. Officials of the new company say they're committed to keeping Bell Labs as one of the world's pre-eminent research facilities. Rich McGinn, AT&T Network Systems CEO, calls Bell Labs the "innovative engine" that drives the equipment manufacturer's product successes.

"When you have the machine that pumps out the new [patents], people want to be associated with you," McGinn says.

The company is hashing out which of the new entities owns which Bell Labs patents. According to McGinn, AT&T went through 1000 patents and found 50 that demanded immediate action to sort out their ownership.

Portions of Bell Labs responsible for developing new long distance services for AT&T's network will remain with the new services company as part of a new AT&T Laboratories, according to Gerry Butters, president-global public networks for AT&T Network Systems. Butters estimates 90% of Bell Labs will remain with the equipment manufacturer.

Some other key elements of the spin-off:

NEW COMPANIES

The new companies are:

- AT&T: The new communications services company keeps the AT&T name. This company includes AT&T Communications Services Group, AT&T Wireless Services, AT&T Solutions and AT&T Universal Card Services. This company will have global revenues of $49 billion.

- Equipment and systems: AT&T Network Systems will join with the Microelectronics, Global Business Communications Systems, Consumer Products and Multimedia Products groups to form the new equipment vendor company, with revenues of more than $20 billion.

With a name for this company yet to be chosen, Butters says, “We have engaged some of the world’s brightest experts to help build brand equity. Many of our employees are sending in lots of suggestions for a new name and brand identity.” Frost & Sullivan’s Joe Fristensky likens the search for a new name to that faced by the spun-off cellular unit of Pacific Bell, which became AirTouch.

- Global Information Systems: The former NCR no longer will manufacture personal computers, focusing instead on the retail, financial and communications markets.

OWNERSHIP

Current AT&T shareholders will own shares in each of the three new companies. Additionally, McGinn expects an IPO for the equipment company next April.

EXECUTIVES

Robert Allen will continue as chairman and CEO of AT&T, the services company. He also will chair a committee of senior AT&T executives who will oversee the spin-off.

Each new company will have a senior officer to lead its transition. Alex J. Mandl, CEO of the Communications Services Group, will head the transition for the new communications services company and McGinn for the new equipment manufacturer.

In the announcement of the spin-off, Allen said permanent executive leadership would be named later. ■

Butters estimates 90% of Bell Labs will move to Network Systems. “Bell Labs is an absolutely grand asset for us,” Butters says (*see sidebar*).

In terms of competitiveness of specific products, Ryan sees a need for Network Systems to play catch-up to other vendors in the high-profile 10 Gbps and beyond range of transmission equipment, where he says the company has been a little late to market. “The strongest challenge for Network Systems is at the high end of their network transmission product line.”

Additionally, Network Systems may need to reexamine its approach to Sonet, according to Ryan. The direction the company has taken is “a little bit idiosyncratic. That’s a cultural change that is going to be required.”

THERE IS THE RISK THAT AT&T COULD BE DISTRACTED OVER THE NEXT YEAR. AT&T WAS DISTRACTED WHEN THEY WENT THROUGH DIVESTITURE. [BUT] I WOULDN’T WANT TO FACTOR IT INTO MY EQUATION.

Perhaps a little optimistically, vendor rivals see potential for some disarray at AT&T as it works through the break-up. “They’re going to have a period of turmoil and confusion,” says ADC’s Ryan. “We’re hoping that confusion reigns for a while.”

Siemens’ Carroll agrees, to a point. “There is the risk that AT&T could potentially be distracted over the next year,” he says. “AT&T as a company was distracted when they went through Divestiture.” He’s quick to add, however, “I wouldn’t want to factor it into my equation.”

Nortel thinks it may have a leg up on its new competitor. “We believe over the short term it gives us some opportunities,” says CEO Jean Monty. If it takes a year or two to complete the corporate separation, management energy and talent could be drained by focusing on these details, Nortel’s spokesperson adds. The different entities face a “need on their part to create a senior management team” that will have to deal with issues such as taxes, foreign exchange rates and stockholder relations that in the past likely fell under the “AT&T umbrella.”

Vendors shouldn’t get their hopes up, says Ryan, who doesn’t expect any serious disarray during the transition. Whenever the final cutover occurs, “The following Monday, I don’t expect any difference.”

Ryan believes Network Systems already addressed its most important management needs by hiring Butters away from Northern Telecom as part of a 1993-1994 management transition. “Gerry Butters is a very aggressive individual,” Ryan says. “He’s a man with a mission.” He calls Butters “a tough individual, but probably the right individual for the job.” The move convinced Ryan a stronger role was planned for Network Systems, and he advised his clients accordingly, predicting a 1995 AT&T split-up well in advance of last month’s announcement.

Indeed, Ryan notes the split-up didn’t really come as a shock and that the signs have been showing for two years. Apart from the management moves, the carrier and equipment companies’ occasional cross purposes had become obvious not just to Butters’ sales people, but to his competitors. “Some of the vendors clearly were anticipating this,” Ryan says.

The Nortel spokesperson agrees the split-up was a long-standing industry rumor, but says he was surprised at the timing. Rabe concurs. “In a kind of general way, I think this was contemplated for a long time.”

So now that it’s happened, the competitive landscape looks different. But as Siemens’ Carroll notes, certain things won’t change. Rival suppliers won’t make any headway against the former behemoth, now merely a giant, if those competitors can’t offer the quality and benefits their carrier customers demand. The break-up opens a few new doors, but that’s about it.

“I don’t think this is any magical event,” Carroll says. ■

ARTIFICIAL INTELLIGENCE

THIS IS YOUR BRAIN ON THE NETWORK

Sprint is testing the use of neural networks for monitoring and predicting potential trouble spots.

Mark Dziatkiewicz
Technology Editor

A rash of transmission alarms inundate the maintenance control center—network equipment is failing somewhere. It could mean lost traffic, angry customers and service rebates. Fortunately, you routed around the potential trouble site hours earlier.

Though they sound futuristic, self-diagnosing networks are closer to reality than you think. Neural networks and other artificial intelligence (AI) technologies provide capabilities for recognizing, monitoring and predicting potential trouble occurrences.

Telecommunications—with its endless network-status data supply—provides a fertile technology testbed. Sprint and AI technology experts at Science Applications International Corp. (SAIC) are a working example.

Sprint and SAIC employ neural networks and AI technology in three projects, testing applicability in monitoring, fault isolation, root cause analysis and, eventually, prediction. The initial project ran live on Sprint's data network, detecting faults on the fly and identifying a culprit software problem. And a pilot trial using real—but not live—network data has achieved 75% predictive levels.

Another fault-isolation project involves monitoring live data in an integrated service management function for broadband networks and services. Recognizing the potential to predict network trouble, Sprint's an active AI supporter. "As we progress in integrated service management for Sprint, we will identify additional applications for these tools," says John Strand, Sprint director-technology planning and integration.

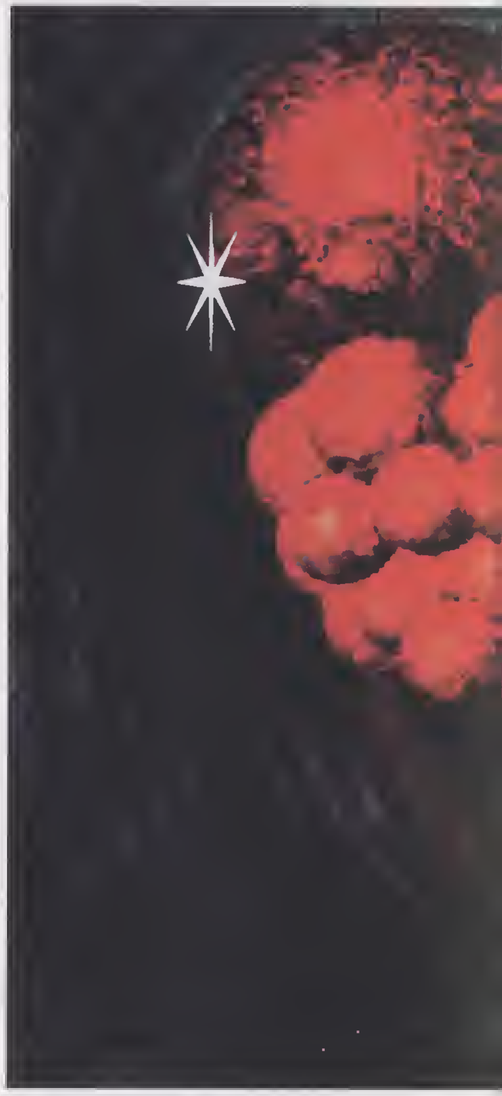
NOT NEW TECHNOLOGY

Neural networks and AI technologies have been around for decades, but only have gained prominence recently. "The technologies are not particularly new, but abilities to implement them are," says Strand. "Available chip sets have started to make applications more practical."

He says the technology's widely understood but has faced considerable implementation hurdles.

"Computing power wasn't there to do it," adds Jacques Hara, director-corporate technology management at Sprint, who dates neural networks back to the early 1940s. The concept derives from attempts to have computers perform and learn like the brain.

The goal was to have computers learn as you add information to their experience set, according to Strand. "New rules would be created automatically by the computer," he explains. "Rule-based systems were the first practical application of artificial intelligence and more recently, case-based reasoning. They're all in the category of making computers more intelligent, allowing the computer to arrive at logical decisions, learn and automate a lot of things."



Rule-based systems often are called expert systems because subject matter experts provide rule-making input, leading to computer-based rules. "You tree through a set of causes and effects and the computer follows the logic of the rules," says Strand. As long as you had these rules, the computer could follow through the series. But situations with rule deviations could pose problems. Unless experts anticipate all logic possibilities, systems will need programming tune-ups.

The lack of pre- or post-programming is an advantage of neural nets, which operate under completely different principles. "They're different from programs written with rules," explains Pam Surko, senior scientist at SAIC. "They use the power of information in massive amounts of data."

Neural nets are "trained" to converge on correct solutions or answers by looking at tons of data. "We take many examples—thousands—of particular behavior. Instead of finding an algorithm or equation that describes the behavior, you present the neural network with thousands of examples of the behavior and adjust the internal parameters of the net until it gives the right answer for each example."

Surko clarifies by using a character-recognition example. Assume the net's objective is to recognize a lower case "a." "You give [the net] a thousand different sizes, orientations and type faces and adjust all the internal parameters until it tells you it's an 'a' when you give it an 'a,'" she says.

BLACK MAGIC

If it sounds a bit like computer black magic, there are similarities. "It's kind of like a black box," adds Dana Di Ferdinando, SAIC senior analyst and Sprint project participant. "You're using weighted elements going through a transformation and you don't know why the neural net came up with the outcome. After the fact, you can't go back and understand how it got the answer."

Neural nets are similar but not equivalent to statistical analysis, according to Di Ferdinando.

"It's a statistical technique that has examples with a lot of noise and you're trying to identify the pattern."

"You learn the relationship between inputs and outputs, rather than the physics of a problem," says Randy Czerniec, SAIC division manager. "With neural nets, you can see the input and output to the box, and the neural net represents the internal workings." Adds Sprint's Strand, "You can see a relationship between the two, but you can't explain why."

Neural networks are adept at detecting patterns but not at explaining how they've done so. "If you've trained a net to look at the stock market and buy or sell, you don't know why it came up with a buy [decision]," continues Surko. "If it were rule-based, you'd know what the criteria is.

*continued on page **44***

INTELLIGENT TESTING

continued from page **43**

Here you know only that for the two years of data you've trained on, you know it's a buy decision."

The net recognizes data patterns associated with specific results. Once tuned properly, it recognizes similar patterns on live data and predicts the behavior occurrence. Pattern recognition and prediction are why neural nets have a big telecommunications future.

TELECOM CONNECTION

Network monitoring's a telecom mainstay, and network elements always have generated status signals and alarm streams. But moves toward intelligent network elements change data streams into rivers—more data than humans can react to, absorb or comprehend.

"You need to be able to interpret faults coming in from various elements of the network," says Strand. "If you have a fiber cut, you're going to get alarms from a lot of elements throughout the network. If they're all coming into a single network management system, how will you know where the source of the problem is?" A trained neural net can analyze the data rapidly and identify the problem's source.

"A lot of the applications we do are testing and monitoring for telecom," says Surko. Telecom systems continuously issue red, yellow and green alarms, and there's continuous line noise level information, bit error rates and temperature fluctuations.

"What you're looking for is pattern in the types of alarms, timing and physically from where they're coming," she says. The net makes correlations between place, time and type of alarm. "It's the same type of information a technician would be looking at, but [the net] has the ability to look at all of it comprehensively."

"There's a tremendous amount of alarm data, and operators get overwhelmed," adds Di Ferdinando. "If they're having a hard time getting at the real meat of the situation, our systems can help them do that. They're not designed to replace operators but to help them do their job more efficiently."

Efficiency and network trouble anticipation are two Sprint neural net objectives, aiming for improved service performance and preventive maintenance opportunities. Project results indicate the company's well on the way to accomplishing both. Combining neural nets and rule-based techniques into hybrid systems, Sprint and other network operators hope to predict network troubles and take appropriate action.

Transmission system protection schemes are an example. Once traffic switches to protection, it eliminates backup for other systems—an acknowledged risk. But knowing when another system is about to fail allows network operators to take preventive measures.

"Suppose I have a particular route or channel that's very important," explains Hara. "If I know it's going to switch to protect and cut out a little of the communication, I can redirect that traffic somewhere else before it happens. It could prevent a much bigger problem from occurring."

The patterns exist in streams of network monitoring data. It could be slight equipment degradations that wouldn't be picked up otherwise. "You can look at trends and start predicting problems," contends Surko. And Hara adds, "We're trying to find the root cause and then predict."

Prediction is the ultimate goal, but it takes time. Nevertheless, Sprint and SAIC are pleased with and encouraged by 75% predictive levels achieved thus far. Access to a never-ending data supply is key, however.

"In the neural network world, if you think about it, you have another element in the data and it's a time stamp," explains Strand. "If I can input the time stamp, it's possible that I can predict. Neural networks can tell me [that] when I see this pattern, something is going to occur. We've begun to correctly predict three out of four times. These are called recurrent back propagation. We are predicting that given the pattern, something will go wrong."

In the final analysis, network operators and customers benefit. Through dynamic network reconfiguration, prioritized traffic receives higher performance assurances, potentially eliminating down time. "If this can detect all kinds of faults, we can take preventive measures to keep our customers happy," Strand concludes. ■

SPRINT'S BRAIN TRUST

WE'RE TRYING TO FIND THE ROOT CAUSE AND THEN PREDICT.—

JACQUES HARA

WE'VE BEGUN TO CORRECTLY PREDICT THREE OUT OF FOUR TIMES.—

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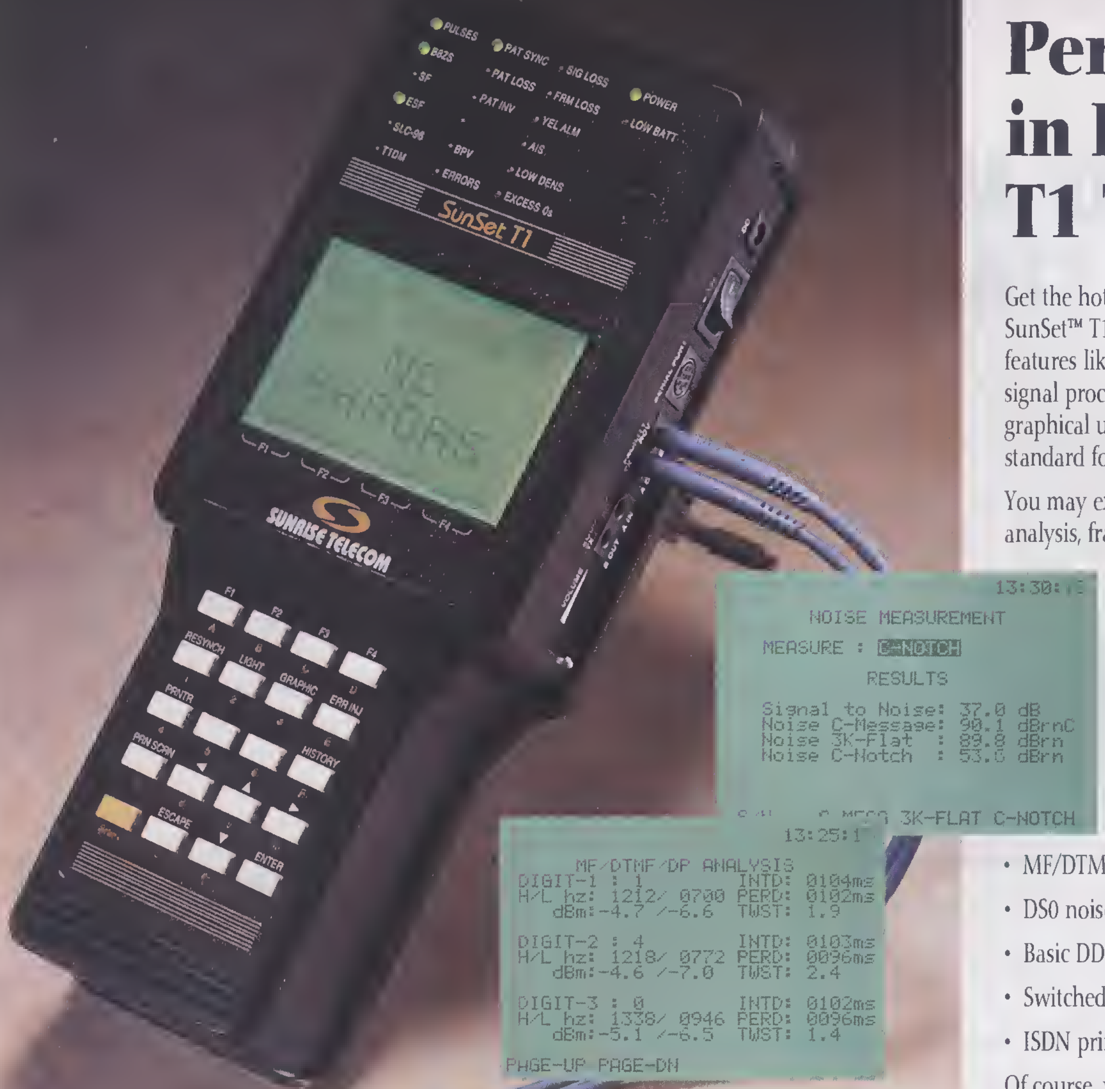

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   Noise C-Notch  : 53.0 dBrn

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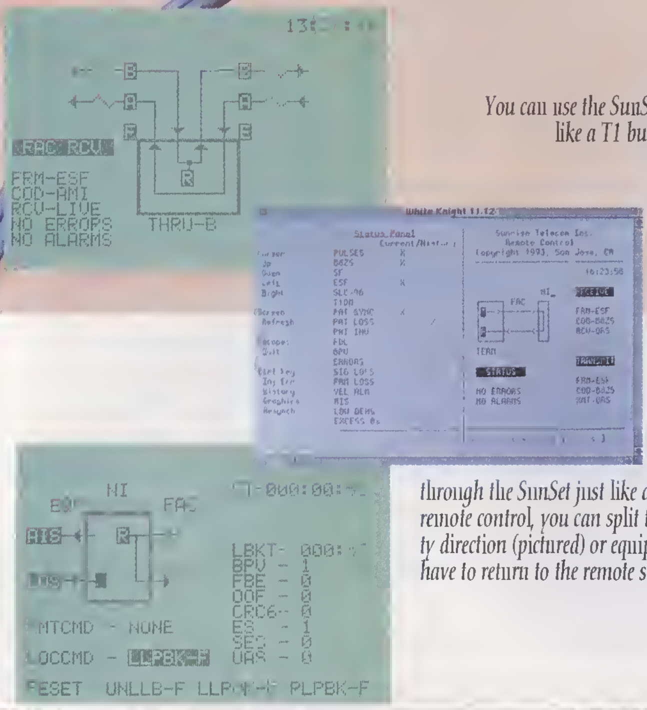

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FAC RCV

FRM-ESF
COD-AMI
RCV-LIVE
NO ERRORS
NO ALARMS         THRU-B
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              LBKT- 000:
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LOS           FBE  - 0
              OOF  - 0
              CRC6-- 0
MTCMD  - NONE ES   - 1
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QUALITY OF SERVICE

WILL THE MOST ERROR-FREE RBOC PLEASE STAND UP?

Arielle Emmett

When quizzed on tangible progress in quality-of-service testing (which aims for "five nines"—99.99999% reliability and availability), RBOCs hedge their answers. "I don't have any statistics on that," is the standard response. "We measure by the number of outages," says Ken Walling, director of the electronic systems assistance center for Pacific Bell. Carl Snyder, manager-network reliability strategies at U S West, acknowledges testing is kludgy and unpredictable: "I don't have any figures that you could probably say [were accurate] for the entire U S West network. What we've been focusing on is testing for specific parts of the network, and there's a difficulty in assessing the reliability of switched versus private lines. We haven't found anything we're comfortable with. It's too new to evaluate."

NO ONE IS WILLING TO SAY PROACTIVE TESTING OR PREDICTIVE SOFTWARE HAS SOLVED ALL NETWORK PROBLEMS.

PROACTIVE MONITORING OR BETTER EQUIPMENT?

What's going on here? Not long ago, telecom mavens and anxious customers predicted that quality-of-service testing—a term originally applied to ATM testing but now extended to in- and out-of-service testing—would make new digital networks much more reliable. Today, the RBOCs are optimistic but cautious. Although preliminary performance data is encouraging, especially for Sonet and DS3, no one is willing to say proactive testing or predictive software has solved all network problems.

"Today, as before, the driver of outages [and their duration] has been software quality," says Pac Bell's Walling. "We've done extensive work with equipment vendors to improve that quality. For example, we do regression testing to improve processes. But the pure complexity of the numbers of features and interactions of network components makes it complicated."

Pac Bell's major performance successes "have been the results of the joint efforts between users and vendors in identifying problems and improving vendor software delivery services."

Pacific Bell perhaps is freer than most in releasing reliability statistics for its switch, transport and cable systems. These performance measures show a steady and impressive decrease in the number of outages since 1990, a trend that should be expected from digitizing networks.

But the origin of performance improvements seems as much a question of network equipment upgrades as generic testing. For example, since 1992 Pac Bell has aggressively installed redundant quadlinks for SS7 switching (in other words, four links from each Pac Bell switch to each signal transfer point—STP). In addition, diverse fiber routes, Sonet rings in loops and diversified signaling links and circuits have registered improvements. "We've had no link failures since 1992-1993," Walling says. "Intraoffice diversity and Sonet rings are helping us quite a bit."

But testing is only as effective as RBOC policy. "We have requirements and expectations of what a particular technology will look like and how it's going to perform," he explains. "When we bring on board a new generic program that has new features and functionality, we test it before it ever gets to the network and make sure it works as it's advertised to work." That puts renewed pressure on software suppliers. "There are still problems with old [software] releases, and interoperability among the major equipment vendors will be a big issue," he says.

DIVERSE STRATEGIES

U S West's quality-of-service testing follows a standard RBOC strategy: "We're starting at the higher levels of the network [T1] and looking down," observes Dave Stubbert, director-service assurance integrated planning. Though cautious about endorsing specific suppliers, U S West uses Applied Digital Access's predictive testing equipment, T-3AS. The equipment conducts performance monitoring, remote tests and remote alarm functions at the DS3 level, he says, adding that the bulk of predictive testing is still on the private line side and is introductory in nature. "We measure the performance of the facility as well as customer ratings we give it; we now have the ability to identify the problem ahead of the customer calling it in."

The switched part of U S West's network—which amounts to the lion's share of residential customers and small businesses—still is not subject to predictive testing. "We have different strategies for monitoring switching machines and private lines," Stubbert continues. "We've had problems with single-point failures, and there is still a big problem with vendor interoperability." For example, although expectations and Sonet deployment are high (Sonet offers its own set of protocols for proactive monitoring), "Sonet equipment manufactured by vendors such as Northern Telecom, NEC and Fujitsu are not always made to the same specs," according to Stubbert. "Sometimes there

continued on page **48**

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QUALITY OF SERVICE

continued from page **46**

are changes that don't work with older technologies. This can be difficult to work through."

Indeed, some experts claim Sonet gives carriers a false sense of security. "Some of the hoopla with Sonet has had to do with automatic protection switching at the physical transport level, as well as its ring architecture and diverse routing," says Chuck Alexander, product line manager, Cerjac Telecom Operations, a division of Hewlett-Packard. "The carriers are able to offer service based on high Sonet availability to the point of being able to guarantee [availability] to customers and generate revenues." But, he adds, quality-of-service testing seems to have generated more questions than answers. "We have the ability to collect lots and lots of performance data. The big challenge people are facing now is the possibility of data overwhelming operators in an alarm control center."

IN SERVICE VS. OUT OF SERVICE

Alexander points to an increasing trend toward out-of-service testing on digital networks. Questions about how to monitor digital networks most effectively have arisen over quality-of-service testing parameters such as peak cell rate (the maximum rate at which a subscriber is allowed to transmit cells into the access medium, OC-3 or DS3 or DS1) and cell delay variation (the amount of delay the service provider can tolerate between customer cells and still deliver the customer guarantee for stability and variation of output).

"From a cell point of view, a lot of testing now is out of service—it's a turn-up test; you can run it through in a few 24-hour cycles," Alexander continues. "After you've done that and the customer is up and running, the issue is what levels of ongoing monitoring can be done by network elements on all those active channels? With the advent of ATM riding on top of Sonet, we're back to the point of out-of-service testing." And, although ATM promises to make networks more reliable, U S West's Snyder says: "One of our biggest problems is that the current operational support systems collecting data are not keeping up with all the capabilities of the network. A big headache is striking the balance between network capability, systems capability and the processes of pulling that all together."

RBOCs have no easy answers to these problems. At Nynex, for example, the focus is on quality-of-service proactive monitoring of a few select hicap services such as T3 links. Bill Trochiano, Nynex assistant vice president-technical operations and support, says, "Over the last three years, we've given ourselves an ability to do performance monitoring on every bit, especially where competition and customer expectation is high." Nynex's Enterprise Service now "guarantees that highest possible availability—99.99999%. We're using intelligent network elements that have a software platform by major suppliers, and we're coming with carrier elements. If we have an outage of some length of time, we give a full month's rebate. In addition, we've set up a network that allows us to control the network elements, do automatic provisioning, maintenance and reconfiguration," he concludes.

THE BIG CHALLENGE PEOPLE ARE FACING NOW IS THE POSSIBILITY OF DATA OVERWHELMING OPERATORS IN AN ALARM CONTROL CENTER.

Like some other RBOCs, Nynex is banking on the spread of ISDN to satisfy the quality needs of small business and average residential customers, according to Trochiano. "You can't predict every failure you have," he says. "While prediction is important, the immediate biggest payoff is having the information about the performance of the network. In terms of the lower bandwidth or residential or smaller businesses, we have strategic ISDN projects for Nynex that will give residents the use of high-bandwidth services at reasonable cost. We've made a strong commitment to ISDN over the last five years, and we will have it widely available by next year within the Nynex footprint."

Centralized monitoring and customer control are key elements of performance at BellSouth. The company boasts twin network reliability centers that monitor switches and facilities in all BellSouth states. "At the network reliability center, we're looking at interoffice facilities and some local exchanges," says Art Finch, manager-NRC surveillance for BellSouth. "We also have a center that is our focal point with interexchange carriers called the Access Carrier Advocacy Center. From the local intraLATA perspective, we monitor the local exchange cable that rides digital loop carrier. We get indications of hits or slips through our operational support system. Based on that, if it's a real-time alarm, we dispatch a trouble ticket and give it to the field organization."

Customers are becoming increasingly demanding of network reliability, Finch adds. "Even PC users from home are demanding higher levels than they have in the past. We're answering that with digital loop carrier systems that we're deploying to residential areas, and increasing use of fiber and high-quality copper." The BellSouth network also is moving rapidly to digital switching—now 80% of its total. "The work content and trouble has gone down," Finch says. "The switches break less, they're easier to fix and there's less down time. They also give us more performance monitoring capability."

Most experts agree that the quality-of-service challenge five years down the road will not be network reliability per se but the problem of interoperating and maintaining standards among a wild field of LEC competitors—including cable companies, which have much less reliability experience than the RBOCs. "We're going to have much more complexity," predicts Pacific Bell's Walling. "We'll see the opening of both local competition and lots more providers of network services, and with the marriage of cable TV and telephony and things like number portability, how we manage everything together is going to be the challenge." ■

Arielle Emmett is a freelance writer based in Washington, D.C.

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HOT PRODUCTS

TEST SET IN A BOX COULD HELP BRING CDMA TO THE MASSES

Vince Vittore
Associate Editor

In the battle of digital air interfaces, CDMA (code division multiple access) appears to hold the early lead given its selection by several A- and B-band PCS carriers and many existing cellular service providers.

STANDALONE UNIT - CMD80's like a base station with test capabilities.

But getting CDMA handsets into consumers' hands is proving slightly more difficult than simply shipping phones to retail outlets, partly because CDMA phones are relatively expensive to produce.

However, Tektronix's new digital communications test set could go a long way toward reducing that cost. The CMD80 is one of the first standalone test sets that can establish and sustain CDMA calls. It also is the first product to come from the alliance of Tektronix, Rohde & Schwarz and Advantest.

In essence, the set acts like a CDMA base station with test capabilities, says Jim Herbert, product marketing manager. Using a Qualcomm chip set, the unit can simulate handoffs, perform complete call set-up, signal control and signal testing between the CMD80 and a mobile unit.

For vendors, the development means an easy and economical way to test CDMA handsets. For carriers, it makes the handsets less expensive by cutting testing costs.

"What you notice is there isn't a clear winner in the air interfaces," says Herbert. "CDMA is a proven technology even though some don't consider it proven. So the question really is an economic one. We become an enabling technology for high-volume manufacturing."

Before the base station in a box was developed, vendors only could test quality in CDMA phones by purchasing a test base station, which could cost millions of dollars. The CMD80 also is aimed at carriers with its capability to field-test CDMA phones by checking frame-error rate, frame errors and frames transmitted. Just as important, the set has been designed with a graphical interface that comes with on-screen instructions.

In the manufacturing application, the set has been designed for IS-98 specifications. However, users can change those specs, Herbert adds. "Hopefully, they'll be tighter." ■

HOT PRODUCTS

ISDN TEST SET CUTS SERVICE FROM EQUATION

Vince Vittore
Associate Editor

ISDN testing has proved a constant problem for vendors. If they don't have ISDN service or aren't located in an area where the local exchange carrier offers ISDN, testing a terminal is next to impossible.

Teltone has developed what it calls "ISDN in a box" for such situations. The ILS-1000 is an extension of the company's test and demo product line that lets users simulate two ISDN Basic Rate Interface lines. The unit doesn't require manufacturers to have ISDN service and lets them test products designed for either U or S/T interfaces.

Carriers can use the product to sell the service; sales reps can demonstrate how ISDN works, without pulling in ISDN lines to the customer's location.

According to Tom Trexler, product manager for Teltone, the unit features a 3.1kHz and 7kHz audio stream, circuit-mode data and D-channel packet-mode data. It also can simulate point-to-point and point-to-multipoint configurations, in-band tones and primary line power to six terminating devices.

For those designing products and services around AT&T's proprietary protocols, the test set supports call control messages and information elements. It also supports auto-initializing terminals such as AT&T Management Information Messages.

Initially, the unit only will support BRI. In the future, however, the company may develop a Primary Rate Interface offering, says Trexler. "It depends on what kind of response the market gives us." ■

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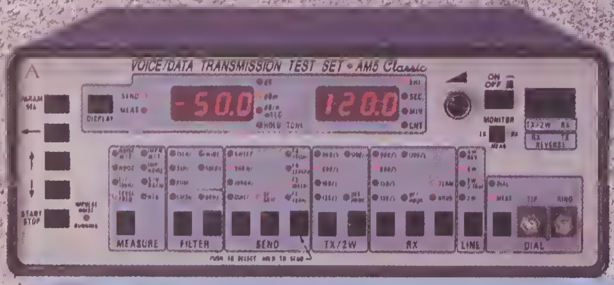

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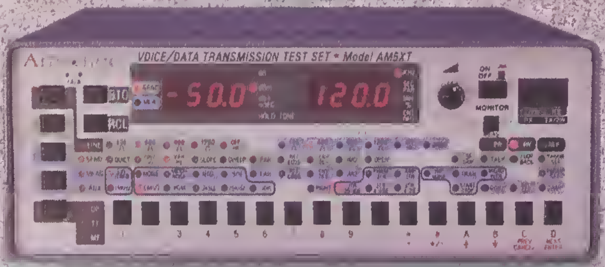

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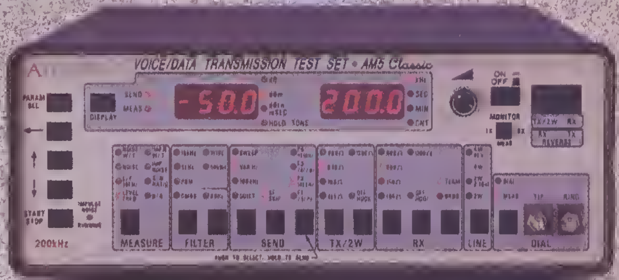

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DIGITAL VIDEO STANDARDS

COME TOGETHER

Extending its compromise climate, DAVIC stays on track for specifications by yearend.

Mark Dziatkiewicz
Technology Editor

Technical substance is replacing Hollywood hoopla as DAVIC moves closer to its global end-to-end multimedia specification supporting hardware and content interoperability.

"In December of this year, we'll have the first set of specifications," says Leonardo Chiariglione, DAVIC (Digital Audio/Video Council) president. "We've defined a system which provides end-to-end interoperability across applications, not just in one particular business segment. Technologists will be able to put together the first set of digital video applications."

It's no small feat considering DAVIC's members represent 200 organizations and 20 countries. The September meeting in Hollywood produced Rev. 4 of its draft specification, on target for 1995 approval.

LIMITS - "We are great, but we are only engineers," says Davic president Leonardo Chiariglione.

"That there wasn't a lot of controversy gives DAVIC organizers a good feeling about what's happening," says Bob Luff, chief technical officer-broadband communications for Scientific-Atlanta. "Companies are working close together to come up with the end-to-end set of complete core specifications.

"We would have been more alarmed if there was great controversy and had to throw out a lot and start from scratch," Luff continues. "When you have such a diversity of companies with previous focuses and different future visions of how their industry or country looks at the future, it's not always easy finding agreement."

Interactive market realities influence DAVIC's compromise climate, and A0 and A1 interfaces are a good example. RBOCs pressing originally for the NIU (network interface unit)-like A0 interface recognize its potential and drawbacks. "The A0 interface splits what was in a set-top into two units," explains Luff. "The back half of an A0 would be identical for HFC, satellite or fiber to the curb. As everyone has begun to understand the technology and challenges presented by the A0 concept, the various folks who have desired an endpoint like an NIU understand the costs involved and appreciate that true practical implementation could be years away."

Practicality looms large in a competitive marketplace, and services deliverable at reasonable rates make more economic sense than A0/A1 interface issues. "When you look at the number of RBOCs that have withdrawn their 214 fiber-to-the-curb applications and are deploying hybrid fiber/coax, it's further evidence that the issues surrounding the A0 are not being faced with a critical decision of what kind of technology to deploy," observes Luff.

Time and better technology understanding clearly have tempered allegations that RBOCs could outgun cable companies in DAVIC proceedings. "All facets of the industry are represented," says Chiariglione. "We are making everybody happy by defining a modulation scheme that works for cable, telephony and satellite. It's here for the purpose of providing a technical solution, so that depending on your business plan, you select the technology appropriate for you."

And future plans push DAVIC beyond cable, fiber to the curb and satellite. The group foresees two new specification versions developing in June and December of 1996. Initiatives include additional modulation schemes and application definitions (*see chart*).

Content developers can only be encouraged by the Hollywood meeting's progress and results. Providing end-to-end definitions and specifications encourages development and reduces risk. "They see the number of people and the immensity of the effort and that it's not just an effort out on its own," says Luff.

And if developers backed off because of unclear markets and technologies, interest is building again. "We have started recruiting a number of companies on the content side," adds Chiariglione. "If we intend to develop technologies, we would like to have content flowing on them, and if they want to have content flowing, they need our technology. We are great, but we are only engineers." ■

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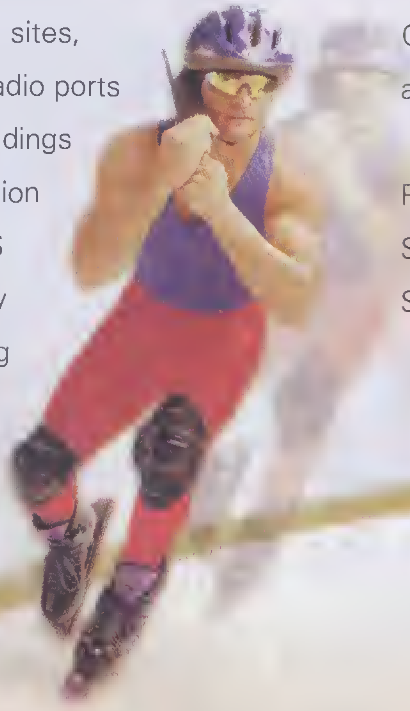

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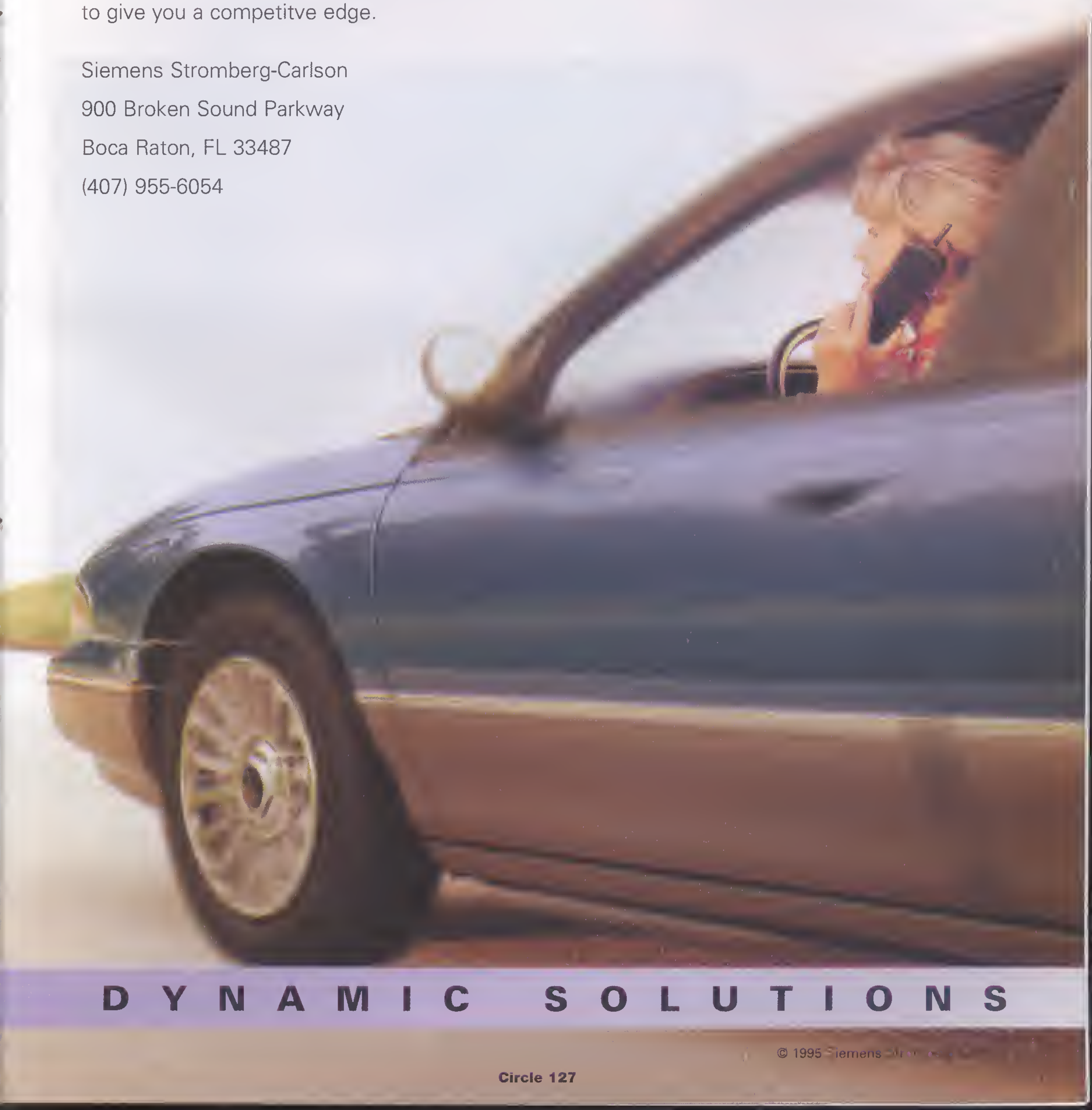

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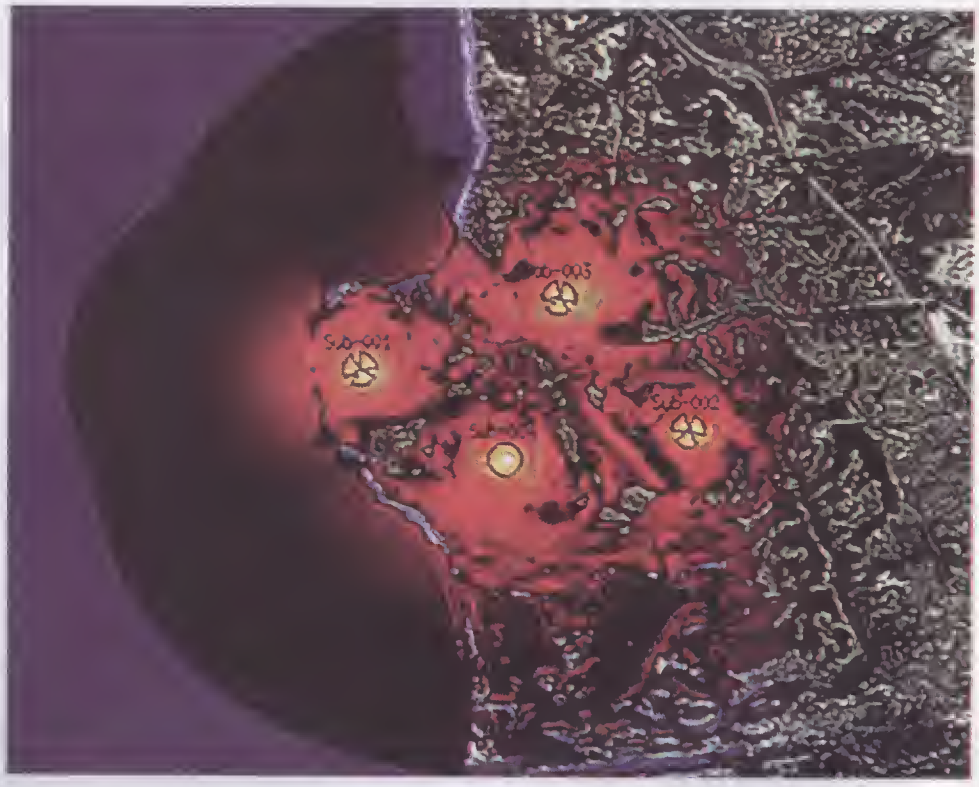
■ PERSONAL COMMUNICATIONS SERVICES

NOW THE HARD PART: GETTING PCS SERVICES OFF THE GROUND

Vendors are developing a new generation of products aimed at solving problems such as cell siting, microwave relocation and support services.

Vince Vittore
Associate Editor



YOU ARE HERE - Qualcomm software aims to help network planners with PCS cell siting. The PCS industry is beginning to recognize that siting and microwave relocation may be its biggest obstacles to quick service rollout.

After several years of worrying about licenses, regulation and air interfaces, PCS carriers finally appear to be getting down to business. With many choosing either CDMA or PCS1900, the next step is figuring out a way to differentiate their service from incumbent cellular providers.

Vendors are responding by announcing a multitude of products aimed at getting services off the ground.

One of the best examples is Qualcomm, a central player in the air interface wars. After touting its CDMA technology and winning over a number of important converts, the company is moving to the next stage with a network planning tool that allows wireless system designers to graphically develop custom network layout and perform detailed system trade-off studies. The QEDesign software kit is designed specifically for CDMA systems, but eventually could be migrated to other technologies, according to Mark Kelley, director-network planning for Qualcomm, who adds the company has developed a version specifically for wireless local loop applications.

ROOFTOP SITES

The Unix-based software employs several different databases to predict CDMA network performance characteristics such as soft handoff regions, forward- and reverse-link coverage, required channel resources and automatic cell size adjustment. The system uses databases including a real estate database from CB Commercial, which provides planners a listing of buildings in metropolitan areas. Combining this with topographic information, planners can determine which rooftops may become candidates for cell sites, saving the cost of constructing towers.

But before cells can be sited and constructed, incumbent microwave users must be cleared. And vendors already are flooding in to help. One of the latest is Alcatel Network Systems, which created a group specifically to handle relocation concerns. Taking a macro view of the market, PCS carriers will need to clear about 4500 microwave paths throughout the country at a cost of about $150,000-$200,000 per site, according to Jim Terwilliger, Alcatel's national PCS sales director.

"If you take a look at who's there, it's really the infrastructure of the United

*continued on page **58***

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PCS

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States," says Dennis Guill, product line manager for Alcatel Network Systems, noting the number of public safety communications systems that will need to be rerouted.

In some cases, vendors also are announcing initial customers.

American Management Systems (AMS) and Sun, for example, announced AirTouch would be the first customer for their customer care system, which will be used throughout California. The system, built on three-tiered client/server architecture, provides customer service reps a variety of benefits including the ability to change or correct a customer's pricing plan instantly.

Ed McCabe, AMS vice president, says he isn't surprised support systems finally are taking center stage with carriers, considering the competition expected in the next few years.

"There are three key issues: cost structure, customer satisfaction and time to market. And you don't see any return on your investment until you bill your first customer. Until then, it's just accounting magic."

Naturally, vendors with air interface technology are keeping the issue alive.

continued on page ***60***

TECHNICAL TRIAL

PACS PACKS PUNCH FOR LEC CARRIER SERVICES

Eric Krapf
Managing Editor

PACS proponents seem to have something for everyone. For end users, they point to their technology's wireline voice quality and mobility reaching full vehicular speed. For potential PCS providers, the pitch is for quick, relatively inexpensive market entry. And now, wireline network operators seem ready to accept PACS as a way to boost network usage by luring those new PCS providers with the promise of AIN services, ready immediately.

Bell Atlantic and Hughes Network Systems are leading the way with a Gaithersburg, Md., technical trial aimed at testing the Generic C interface that gives PCS customers access to Advanced Intelligent Network (AIN) features. The trial represents the middle of a three-phase effort focusing on PACS mobility, Generic C testing and AIN services, according to Kal Ganesan, assistant vice president-digital cellular networks at Hughes.

"We want to understand the operational scenario in terms of how a PCS system could be deployed using existing network resources," Ganesan says.

That's crucial to providers seeking quick service rollouts, especially designated entities (DEs), which won't have large capital reserves for buildouts after the upcoming auction of smaller Basic Trading Areas (BTAs).

"There's quite a bit of infrastructure out there that a DE could use," Ganesan says, citing "the amount of money you save by reusing the infrastructure."

The view is much the same from the wireline carrier's perspective, according to Peter D'Amico, senior product manager for Bell Atlantic's Carrier Services organization.

"We're looking at the next round of the auctions, when the DEs may be short of capital," D'Amico says. These entrepreneurs represent a whole new market for RBOC carrier services divisions. As Ganesan points out, "They want to increase minutes of use on their network."

PACS (Personal Access Communications System) design features radio ports acting as mini-cell sites, linked to radio port control units (RPCUs), which join the existing wireline network through the Generic C interface. This interface lets the PACS system interoperate with Service Control Points (SCPs) of the wireline carrier's AIN. Hughes will supply the radio equipment in the Maryland trial.

PCS inevitably will be linked to call forwarding, 500 numbers and other mobility services, making AIN indispensible to its success, Ganesan believes.

AIN ON DAY ONE

Though AIN services are expected to be available with other PCS air interface technologies such as code division multiple access, right now "we believe PACS is the only technology that can provide AIN on Day One," Ganesan asserts. By contrast, cellular-like technologies "have a long way to go" to reach AIN interoperability.

The Generic C interface may not have a long way to go, but still requires some "tweaking," D'Amico concedes. "It's by no means, everything is done and this is just to confirm it works," he says. "It's very much a developing process."

D'Amico envisions future Generic C trials with CDMA. "The theory is, it all should work the same," but complications can arise; if, for example, different vendors create systems with variations in functionality, the interface must be able to handle it.

Hughes, which has partnered with Bellcore and Siemens Stromberg-Carlson to offer a turnkey PACS solution, sees PACS helping DEs move to the cutting edge of PCS service enhancements.

"It's going to be a proving ground for a while," Ganesan says. ■

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- 12 ☐ 55 Independent Cable TV System
- 13 ☐ 60 Cable TV Contractor/Engineering Firm
- 14 ☐ 65 Other Cable

Wireless Operators
- 15 ☐ 190 Cellular Operator
- 16 ☐ 195 PCS/PCN Operator
- 17 ☐ 205 Other Wireless

- 18 ☐ 180 **Long-distance/Interchange Carrier**
- 19 ☐ 185 **Competitive Access Provider (CAP)**
- 20 ☐ 220 **Telecommunications Reseller**
- 21 ☐ 170 Other Carrier
- 22 ☐ 120 **TELECOMMUNICATIONS CONSULTANT**
- 23 ☐ 135 **CONSTRUCTION CONTRACTOR**
- 24 ☐ 140 **CONSULTING ENGINEERING FIRM**
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- 26 ☐ 400 **OTHER**

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- 29 ☐ 13 **Management** (VP, General Manager, System Manager, Manager, Director)
- 30 ☐ 3 **Corporate Management** (Chairman, Owner; President, Partner, Executive/Senior VP/Director, Treasurer, CFO, COO)
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- 40 ☐ 6 Sales/Marketing
- 41 ☐ 7 Customer Service
- 42 ☐ 8 Other (describe) ____________________

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101	130	159	188	217	246	275
102	131	160	189	218	247	276
103	132	161	190	219	248	277
104	133	162	191	220	249	278
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Ganesan, assistant vice president-digital cellular networks at Hughes.

"We want to understand the operational scenario in terms of how a PCS system could be deployed using existing network resources," Ganesan says.

That's crucial to providers seeking quick service rollouts, especially designated entities (DEs), which won't have large capital reserves for buildouts after the upcoming auction of smaller Basic Trading Areas (BTAs).

"There's quite a bit of infrastructure out there that a DE could use," Ganesan says, citing "the amount of money you save by reusing the infrastructure."

The view is much the same from the wireline carrier's perspective, according to Peter D'Amico, senior product manager for Bell Atlantic's Carrier Services organization.

"We're looking at the next round of the auctions, when the DEs may be short of capital," D'Amico says. These entrepreneurs represent a whole new market for RBOC carrier services

can provide AIN on Day One," Ganesan asserts. By contrast, cellular-like technologies "have a long way to go" to reach AIN interoperability.

The Generic C interface may not have a long way to go, but still requires some "tweaking," D'Amico concedes. "It's by no means, everything is done and this is just to confirm it works," he says. "It's very much a developing process."

D'Amico envisions future Generic C trials with CDMA. "The theory is, it all should work the same," but complications can arise; if, for example, different vendors create systems with variations in functionality, the interface must be able to handle it.

Hughes, which has partnered with Bellcore and Siemens Stromberg-Carlson to offer a turnkey PACS solution, sees PACS helping DEs move to the cutting edge of PCS service enhancements.

"It's going to be a proving ground for a while," Ganesan says. ■

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PCS

continued from page **58**

However, there appears to be more emphasis on low-tier technologies, such as PACS and DECT.

Bellcore, which has paired with Siemens Stromberg-Carlson and Hughes Network Systems to offer a PACS turnkey solution to BTA licensees (*America's Network*, Oct. 1), now is pushing the standard for more than just pedestrian mobility applications. In recent tests, the company proved its PACS-based system could be used in vehicles traveling 70 mph.

"In high-mobility applications, speed isn't an issue. It's coverage," says Bob White, director-wireless analysis for Bellcore. Traffic pattern analysis reveals most traffic is concentrated on just a few major highways, where coverage can be focused, he adds.

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The group also is pushing into the wireless data arena, demonstrating how the standard can be used for Internet access. By combining two of the eight voice channels PACS offers at the home, users can access service providers at rates as high as 28.8 kbps.

"In the future, we want to combine slots on demand," says Vinay Patel, marketing manager for Hughes, adding the company also is looking into providing video services by combining all eight channels.

Not to be overshadowed, Ericsson is continuing its push for TDMA-based DECT systems. Its most recent U.S. version of the technology, the SuperCordless line, is being positioned as a wireline replacement product that allows users to carry their custom calling features with them in a limited area.

"It's essentially taking the wireline features and making them mobile," says Bengt Anderen, regional vice president-network systems.

Ericsson's system is based on its AXE switch and includes a mobility manager, radio exchange base stations and the handsets. "This is not really a loop replacement because it also provides mobility," he says. ■

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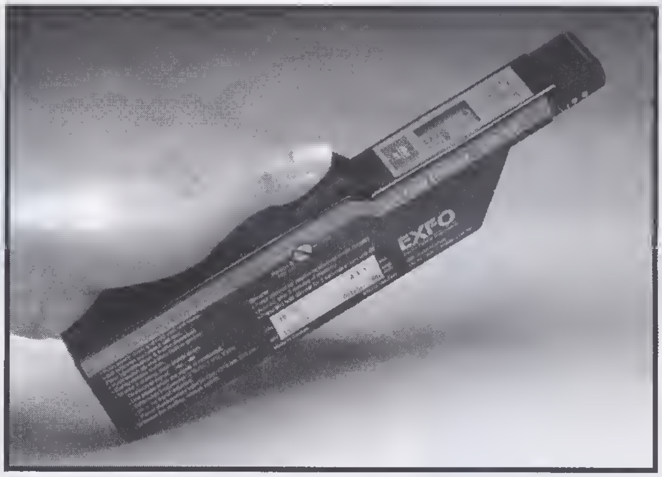

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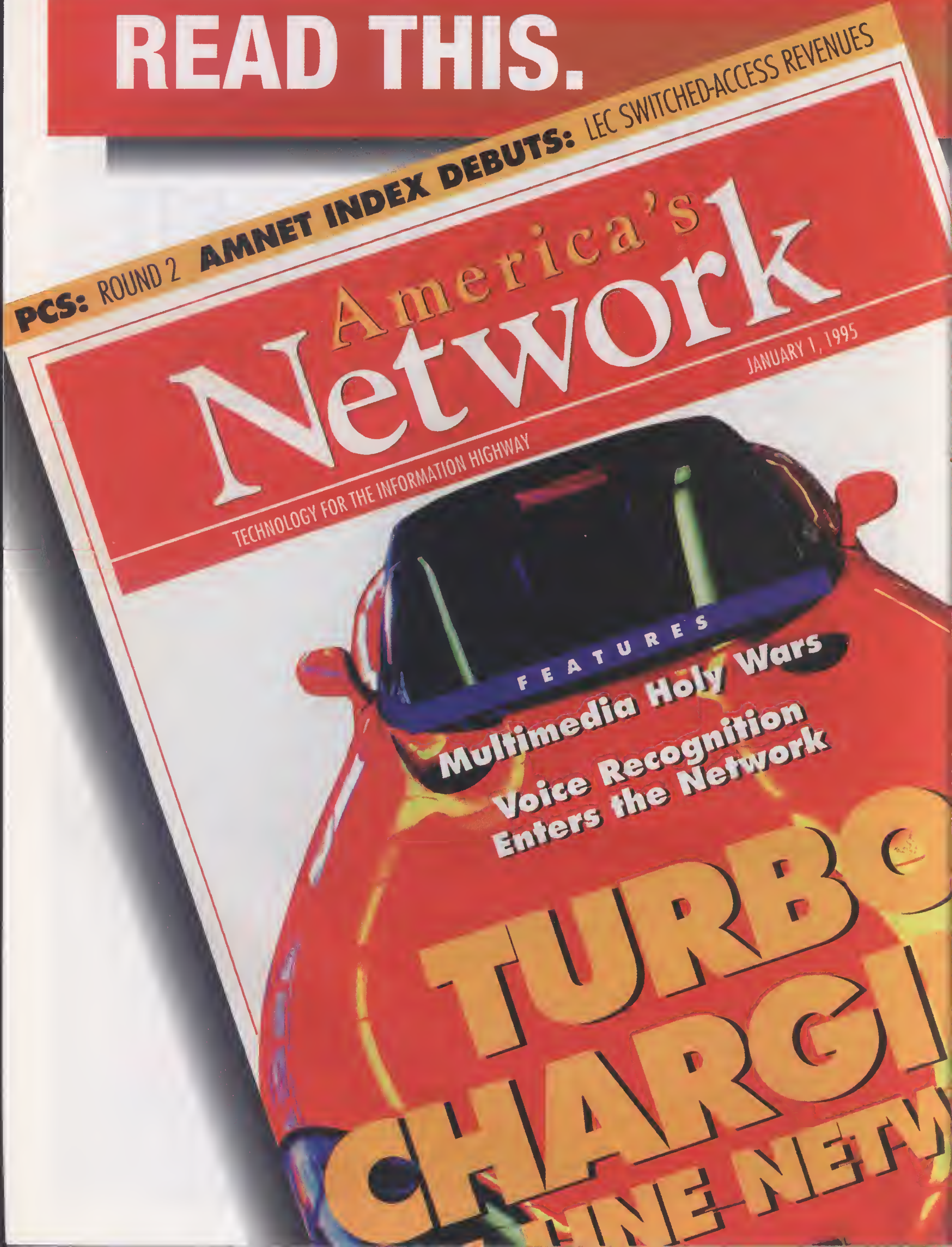

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ADSL TECHNOLOGY

NEW OFFERING AIMS AT INTERNET, LAN

Eric Krapf
Managing Editor

With big fiber and hybrid coax network plans stalling and Internet eclipsing video as the hot advanced service, copper's looking like it may have a future after all—especially as new technologies beef up its capacity.

Hot on the heels of its announcement of 6 Mbps ADSL availability (*America's Network*, Aug. 15), AT&T Paradyne is filling out its GlobeSpan product line with a technology it calls symmetric digital subscriber line (SDSL). Paradyne will offer SDSL on a chip set that includes ADSL (asymmetrical digital subscriber line) and HDSL (high bit-rate digital subscriber line) components, giving customers flexibility to choose among the three.

As its name suggests, SDSL features equal upstream and downstream transmission speeds, from 128 kbps to T1/E1. The company expects key applications to include business video conferencing, high-speed Internet access and other data services, according to spokesperson Garrick Case.

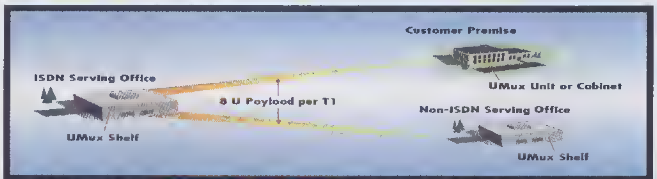
SDSL continues a trend toward using GlobeSpan technology for data, Case says. Paradyne boosted 6 Mbps ADSL's reverse channel from 16 kbps to 64 kbps to make it more attractive as a data technology, and Case believes SDSL matches the industry's shift in emphasis from residential broadcast video to data services.

"We could've announced SDSL two years ago, but there wasn't a need for it," Case says. "There wasn't an Internet then." At least not like there is now.

The new SDSL product will be in controlled introductions next month, with general availability in December.

Despite the data emphasis, faith in video over ADSL isn't flagging. Bell Atlantic's trial in Virginia is proceeding and carriers should have provisioning costs down to the goal of $500 per line by mid-1996, Case says.

"ADSL and SDSL are going to be with us a long, long time," Case promises. ■



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Eric Krapf
Managing Editor

Cherokee Nation Industries (CNI) is a Native American success story. Now the 26-year-old defense contractor wants to be a telecom success.

Industry leaders vow they'll continue to encourage CNI and other minority-owned companies, whatever course the national affirmative action debate takes, because using minority contractors is good for business.

As proof of this commitment, CNI just won its first telecom contract—a three-year, multimillion-dollar deal for fiber optic equipment. Parts will be supplied by AT&T Network Systems, assembled by CNI and sold to Southwestern Bell. This is the second part of a three-phase program, explains Meredith Frailey, CNI's marketing director. Initially, CNI distributed finished products to Southwestern Bell for AT&T. Under the new contract, CNI workers will perform some assembly and receive training to complete the entire process for specified pre-terminated and pre-connectorized termination boxes. Once CNI can produce the boxes itself, it will stock raw components and custom-assemble and deliver them in three days instead of the previous turnaround time of

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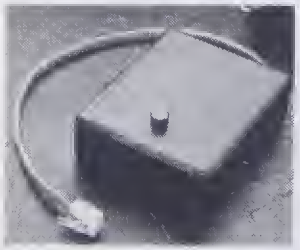

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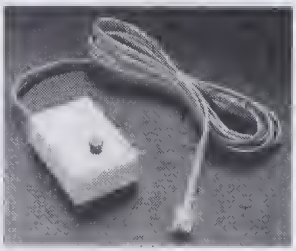

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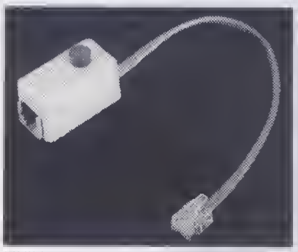

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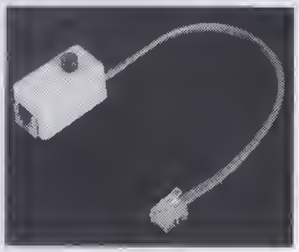

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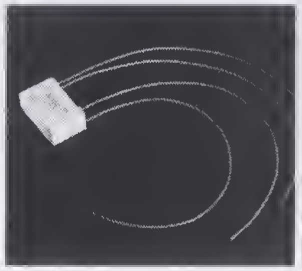

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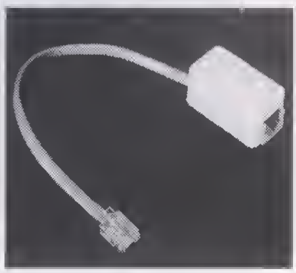

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three weeks, says Kenny Goodsell, contract manager for Southwestern Bell.

The CNI contract represents a trend in minority telecom contracting, according to Goodsell. During the 1980s' defense buildup, the federal government initiated minority-inclusion programs. Goodsell notes defense and telecommunications manufacturing share many common elements. "They were doing the work; all we were asking them to do was to change the medium."

With defense budget cuts, these companies are looking to diversify. "We've been able to tag along," Goodsell says. "The timing is pretty perfect. Blind luck is a powerful thing in the universe."

Luck may have broadened the pool of potential minority- and women-owned telecom contractors, but large vendors and carriers say they turn to these suppliers out of necessity—and if anything, they plan to expand these efforts.

The unified AT&T (services and equipment) this year contracted 7.5% of its business to minority- and women-owned business enterprises (MWBEs), according to Virginia Hardesty, manager-MWBE business development. That percentage will account for $1.3 billion-$1.4 billion, up from $1 billion last year. AT&T has 3100 relationships with MWBEs and actively has been seeking their involvement since 1968.

CALIFORNIA GOALS

Pacific Bell operates under a state public utility commission mandate that set a goal of 15% MWBE participation in contracts for 1994. The telco surpassed that goal with actual purchases of $350 million or 15.7%, according to Carol Ikami, executive director-strategic market initiatives.

In the state where affirmative action has come under the strongest attack, the PUC mandates a goal, not a set-aside—a "very important distinction," Ikami notes. Where a set-aside would guarantee a certain percentage of contracts to MWBEs, California only requires the company aim for the specified participation level by seeking out qualified contractors to bid, with "no guarantee or no assurances that minority-owned businesses are going to get that award level."

Pac Bell surpasses these goals for its own benefit as well as the contractors' and society's, Ikami says. "California is obviously a very diverse state," she says. "We serve California, and what we want to focus in on is to satisfy our customers."

Ikami concedes "certainly a public relations component is there," but stresses "it's good business to do business with the California communities we operate in." Hardesty agrees, noting minorities and women are AT&T customers: "Every segment brings with it a point of view that

continued on page ***68***

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MINORITY VENDORS

continued from page **67**

one segment alone maybe couldn't," she says.

Goodsell notes Southwestern Bell likewise serves a region of ethnically diverse communities. "If the sole driving force behind our programs were regulatory fear—sure" they could be open to criticism. But "we need to do business with minority-owned firms because it's good business for us." On affirmative action, Goodsell concedes "that question certainly has been raised," but he characterizes discussion as "the usual water cooler talk."

A recent Commerce Department report supports the telco executives' claims that contracting with minority-owned businesses aids minority communities. "Minority-owned companies, regardless of their size or location (urban or suburban), tend to hire minorities," the report asserts. "Non-minority-owned firms, on the other hand, tend to hire non-minorities, even when those firms are located in minority communities."

But even though companies remain committed to seeking out minority-owned contractors and fostering their development, such businesses face a crucial obstacle, according to the Commerce Department. The report notes telecommunications is a capital-intensive business, that "there are real barriers to minority participation in telecommunications, and that minorities often lack access to the types and amounts of capital required to form and expand telecommunications businesses."

But the report's news isn't all bad for minority-owned businesses. Citing *Black Enterprise* magazine's list of the 100 largest African American-owned businesses, the report notes 33 telecommunications firms employing 10,821 people made the list in 1992; 28 companies employing 10,007 remained in 1994. Yet in that period, these companies' revenues climbed from $1.35 billion to $1.4 billion. And similar statistics from *Hispanic Business* magazine showed 36 telecom companies made the top 500 in 1992, a figure that jumped to 51 by 1994, with revenues more than doubling, from $471 million to $963 million.

Furthermore, minority business people acknowledge the capital crunch but downplay it as a barrier unique to minorities. Ronald Montoya, president and founder of Denver-based Plasticom Industries, which supplies wire, cable and connectors, says, "It was a problem in the beginning and it still remains a problem, getting working capital." And he says minority startups may face higher hurdles: "You don't normally fit into that square box that the banking community uses."

But Montoya says his 20-year-old company has shied away from set-aside programs, and he places responsibility on companies to find market niches; like CNI, Plasticom started out doing related work in other fields and only now is increasing its telecom workload.

"It's incumbent on us to look at diversifying our companies and branching out into other areas," Montoya says.

GETTING STARTED

James Scott, founder and president of Malvern, Pa.-based Lexcom Telecommunications, saw opportunities as a veteran of Lorain Products and Bell of Pennsylvania. His distribution and supply company was a response to LECs' increasing desire for smaller inventories and quicker turnaround. He says coming up with startup capital is hard for any entrepreneur. "I pretty much had to fund the business on my own," Scott says. But it's paid off. At the end of its first year (1989), Lexcom had $200,000 gross sales. The company that started in Scott's basement now has branches in Dallas, Atlanta and California and this year expects $7 million in sales.

Though large carriers and suppliers vow to continue seeking out minority-owned businesses, the contractors say they can't rely on mandated programs to compete. Rather, like any small suppliers, they hope to use their vendor relationships to improve their own products and processes. For example, AT&T and Southwestern Bell are helping CNI obtain its ISO 9000 certification, which their contract requires.

"We don't market our minority status," says CNI's Frailey. "We market our capabilities." ■

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ITINERARY

DATE	NAME	LOCATION	HOTEL/SITE	INFO/PHONE
Oct. 15-18	National Communications Forum (NCF95)	Rosemont IL	Hyatt Regency O'Hare	312-938-3500
Oct. 15-19	Electronic Industries Association Annual Conference	Scottsdale AZ	The Phoenician Hotel	703-907-7500
Oct. 16-18	18th Annual Conference on Fiberoptics Markets	Newport RI	Newport Marriott	401-849-6771
Oct. 16-20	Carolina-Virginias Telephone Membership Assn. Fall Meeting	Asheville NC	Grove Park Inn and Country Club	202-298-2328
Oct. 17-18	Fundamentals Video/Multimedia	Chicago IL	The Drake Hotel	800-227-1234
Oct. 18-20	International Wireless Communications Expo (IWCE)	Tampa FL	Convention Center	800-828-0420
Oct. 22-24	Mid America Telecom Showcase and Seminar	Kansas City MO	Hyatt Regency	913-234-0307
Oct. 23-24	Wireless Data Networks	Chicago IL	Tremont Hotel	312-540-3856
Oct. 23-24	Wireless Business Telephone Systems Seminar	Minneapolis MN	Minneapolis Marriott	602-948-8225
▼ Oct. 23-25	Midwest Regional Telecommunications Expo (IN, OH, MI)	Fort Wayne IN	Grand Wayne Center	317-635-1272
Oct. 23-25	Emerging Broadband Technology	Chicago IL	The Drake Hotel	800-227-1234
Oct. 23-25	CMA '95: Communications Managers Association Conference	New York NY	New York Hilton	609-384-6287
Oct. 24-25	Tele-Solutions EAST	St. John NB	St. John Trade and Convention Center	800-267-4529
Oct. 25-27	TeleConferencing Users Conference	Anaheim CA	Anaheim Convention Center	405-743-0320
Oct. 29-Nov. 1	Intelec '95	The Hague, Netherlands	Congress Center	908-221-0013
Oct. 30	ITS International Monitor Awards	New York NY	Lincoln Center	212-877-5560
Oct. 30-Nov. 1	Re-engineering the Telecom Back Office	Washington DC	Vista Hotel	800-822-6338
Oct. 30-Nov. 2	The Third Biennial International Regulators Workshop	New York NY	Columbia University	212-854-4222
Oct. 31-Nov. 1	Wireless Data II (CTIA Fall Conference & Expo)	Las Vegas NV	Mirage Hotel	202-785-0081
Oct. 31-Nov. 3	Hands on HGH Performance Cable	San Francisco CA	Grosvenor Hotel	800-227-1234
▼ Nov. 1-3	ALTS Conference and Exposition	Palm Springs CA	Westin Mission Hills Resort	202-466-2581
Nov. 1-3	UNICOM '95	Washington DC	Convention Center	202-296-9800
Nov. 2-3	ID Info: San Jose	San Jose CA	Le Baron Hotel	800-331-5706
Nov. 2-3	Fifth Annual North American Telecom Investment Opportunities Conference	Pebble Beach CA	Lodge at Pebble Beach	800-255-2099
Nov. 5-7	Cooperative Strategies and Solutions: Building a National Info-Structure	Alexandria VA	Radisson Mark Plaza Hotel	800-669-4826
▼ Nov. 5-8	USTA National Conference	Orlando FL	Marriott/Hilton	202-326-7279
Nov. 6-8	Iowa Telephone Association	Des Moines IA	Crystal Inn	202-298-2328
Nov. 6-9	Next Generation Networks Annual Conference	Washington DC	Crystal Gateway Marriott	800-227-1234
Nov. 8-9	North Dakota Telephone Association Fall Conference	Minot ND	Sheraton Riverside Inn	202-298-2328
Nov. 8-10	Interactive Entertainment	Washington DC	Sheraton Carlton	800-822-6338
Nov. 11-13	NIUF (ISDN) Fall Meeting	Gaithersburg MD	National Institute of Standards & Technology	301-975-2937
Nov. 12-15	American Telemarketing Association Convention	Hilton Head SC	Hyatt Regency	213-463-2330
Nov. 13-16	CMA Telecom	New York NY	New York Hilton and Towers	800-262-3976
Nov. 13-16	44th International Wire & Cable Symposium	Philadelphia PA	Philadelphia Marriott	908-389-0990
Nov. 13-17	COMDEX Fall '95	Las Vegas NV	Convention Center	617-449-6600
Nov. 13-16	NARUC Annual Convention	New Orleans LA	N/A	202-898-2200
Nov. 14-15	Bar Code Solutions and Strategies Seminar	Dallas TX	Arlington Hilton	800-733-7592
Nov. 16-17	Video Dialtone Summit	Washington DC	ANA Hotel	202-408-0008
Dec. 4-6	Implementing Local Exchange Competition	Washington DC	Marriott Metro Center	800-822-6338
Dec. 4-6	North Dakota Association of Telephone Cooperatives Annual Meeting	Bismarck ND	Radisson Inn	202-298-2328
Dec. 4-8	SUPERCOMPUTING '95	San Diego CA	Convention Center	619-534-5039
Dec. 6-8	Multimedia ComForum and TecForums	Bal Harbour FL	Sheraton Bal Harbour	312-938-3500
Dec. 12-13	Bar Code Solutions and Strategies Seminar	Chicago IL	Ramada O'Hare	800-733-7592
Jan. 5-8	Consumer Electronics Show	Las Vegas NV	N/A	202-457-8700
Jan. 8-10	SCTE Conference on Emerging Technologies	San Francisco CA	N/A	610-363-6888
Jan. 11-12	NECA Board Meeting	Orlando FL	N/A	202-298-2328
Jan. 14-18	18th Annual Pacific Telecommunications Conference	Honolulu HI	Sheraton Waikiki	808-941-3789
Jan. 15-18	BICSI Winter Conference	Orlando FL	N/A	800-242-7405
Jan. 16-18	COMDEX/PacRim	Vancouver BC	N/A	617-449-6600
Jan. 22-26	Alaska Telephone Association Winter Conference	Maui HI	Westin Maui	202-298-2328
Jan. 22-27	DPASTCD Winter Convention	Marco Island FL	Marriott Hotel	202-298-2328
Jan. 24-26	AFCEA Western Conference	San Diego CA	N/A	703-631-6200
Jan. 24-26	MexCom '96	Mexico City, Mexico	N/A	305-670-9444
Jan. 29-Feb. 1	Communications Network '96	Washington DC	N/A	617-769-8950
Jan. 30-Feb. 1	Telecom Resellers Association Conference	Huntington Beach CA	N/A	703-734-1225

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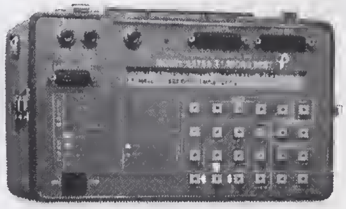

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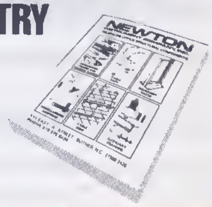

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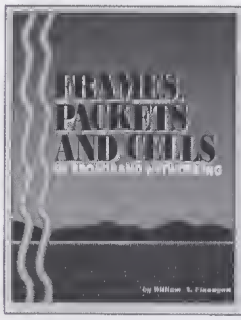

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AT&T BEATS COMPETITORS AND REGULATORS TO THE PUNCH

Alan Pearce, Contributing Editor

Why did AT&T split asunder—this time voluntarily? At first blush, the reason is obvious: to strengthen its core businesses—telecommunications services (wired and wireless) and telecommunications equipment.

But the move has political ramifications as well. Politicos in Washington, D.C., and Brussels believed AT&T was beginning to dominate certain critical sectors of the telecommunications industry. Of particular concern to competitors and policymakers:

- AT&T, which already has 60% share of the U.S. long distance market, now is going after wireless, buying up McCaw Communications and PCS spectrum. Without even attempting to market the synergy between long haul and cellular, AT&T already controls about 15% of a burgeoning wireless market in the U.S., and it has not even begun to build its PCS network.
- Globally, AT&T recently formed strategic business alliances in wireline and wireless services and equipment, primarily in Europe, the world's second-largest and fastest-growing telecom market; Asia, which is the third largest; and Latin America.
- The combination of AT&T's U.S. market dominance, global alliances, equipment manufacturing arm, powerful research and development labs and its transaction-intensive computing business raised the interest and fears of competitors and policymakers. In short, AT&T was getting too damn big for its britches.

So the strategy to split was hatched in part to placate policymakers, politicians, shareholders, customers and—yes—even competitors.

If you look at AT&T's recent lack of success in D.C., the picture becomes clearer. AT&T's primary goal, to maintain restrictions on the seven regional Bells, failed miserably. So now, having lost the battle on Capitol Hill, AT&T will go toe to toe with them in the local loop. Currently major customers of AT&T's equipment arm, the RBOCs are not likely to purchase billions of dollars of equipment when AT&T is stealing valuable local exchange revenue.

An almost identical issue arises globally. Overseas, AT&T is recognized as the only major telephone company that also manufactures equipment. Its global competitors—BT-MCI, DT-FT-Sprint, NTT, etc.—won't ever buy equipment from a company that competes with them in the service market.

Lest we forget, competitors have a habit of complaining to politicians and policymakers when big, successful companies like AT&T become powerful in various market segments. Accusations of predatory pricing, the assertion of undue market power, self-dealing, exclusionary business tactics and the like often are hurled at such companies. So AT&T decided to beat competitors—and regulators and politicians—to the punch.

WHAT'S IN IT FOR AT&T?

For starters, AT&T relieves itself of potential antitrust problems. It also takes the FCC out of the picture because the commission is anxious to promote competition but does not want one company dominating all sectors.

Finally, AT&T's primary business lines—Communications Services with $50 billion in global revenues and Communications Systems (equipment) with $20 billion in revenues—are strengthened competitively.

The most obvious competitive advantage goes to AT&T Communications Services, which currently shoulders 80% of Bell Labs' annual $3.4 billion budget. In the future, AT&T will get by on 20% of that, and the billions it saves can be passed on to its wireline and wireless customers.

The equipment company may have some tough cost problems, which clearly have an effect on overall competitiveness. Although its market theoretically will expand markedly both domestically and globally, it will confront increasing costs—80% or $2.7 billion of the annual cost of Bell Labs' upkeep. This will make it less competitive and therefore more inclined to cut costs.

If cost cutting comes at the expense of research and development, American technological and competitive leadership in telecommunications may be in jeopardy. But we can worry about that later. For the time being, a divided AT&T is on a competitive fast track, both domestically and globally, and it can begin to conquer two discrete and rapidly-growing markets—services and equipment.

And a divided and conquering competitive AT&T also rids itself of those pesky bureaucrats and politicians in Washington, D.C., and Brussels. Surely no one can argue with that strategy. ■

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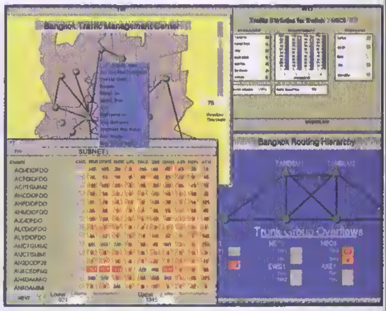

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